Lesson 2
Scan Operations and Procedures

Objectives

- Review the guidelines for human scanning and supply references for further information
- To scan safely
- To scan efficiently
- To find the scan data

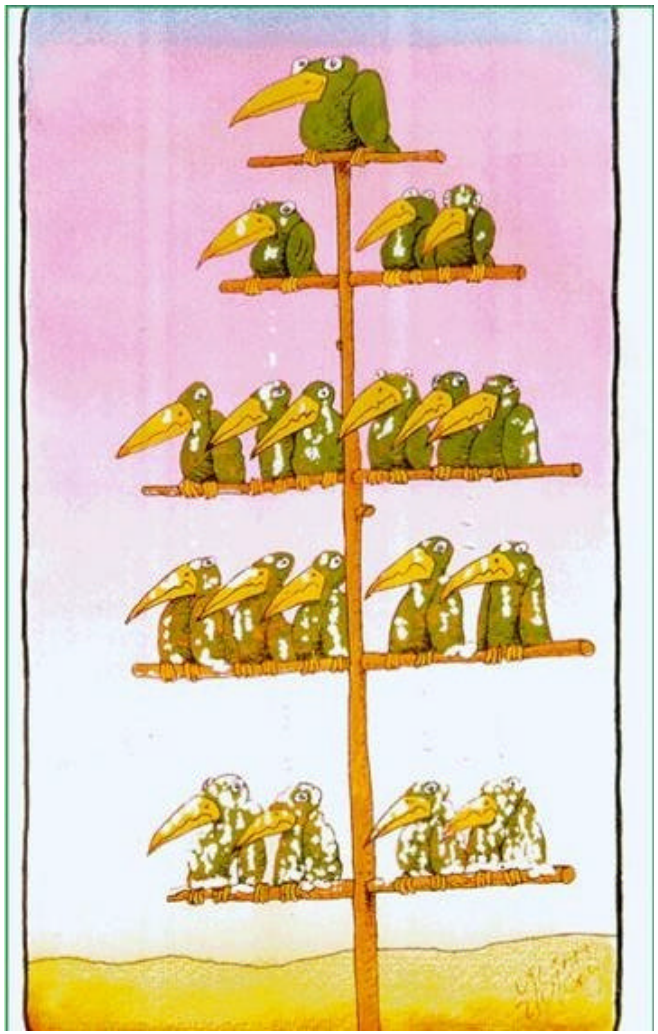
Lesson 2

Scanning Procedures

- The LX icons
- The icon functions

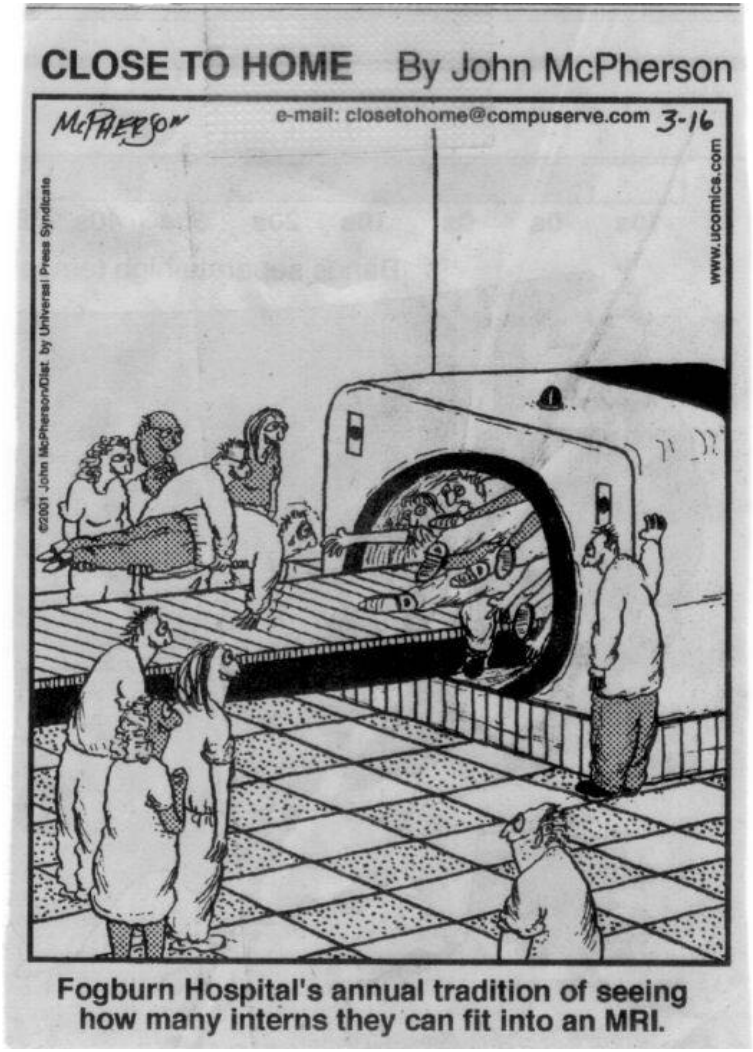
Normal Scan Operations

- Signa Boot/Reboot
- EPI
  - GERT
  - NIH EPI
- Anatomical Scans
- Clinical Scans



Scanner Operations

- The GE Icons
  - General
  - Specific Functions
- Scanner Boot / Reboot Procedures
- EPI Scanning
  - GERT
  - NIH EPI
- Anatomical Scanning
  - Structural Scans
  - Clinical Scans
- Tech Tips and Tricks



The Various GE LX Icons

- Date and Time
- Informix Space
- Message Board
- Scanner Operations
- Protocol Manager
- Browser
- Network
- Tools
- Piece of the Puzzle

Specific Icon Functions and Uses

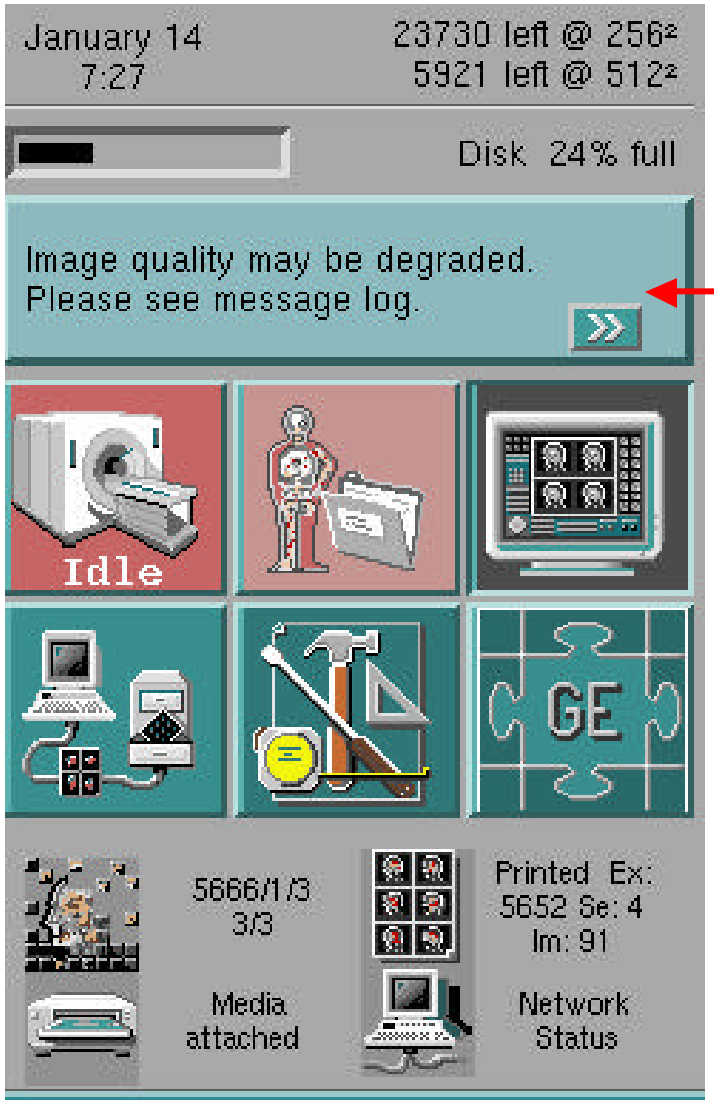
- Date and Time
  - Use Signa Time for the Logbook and Notes

- *Informix* Image Database Space
- Message Board
- Scanner Operations
- Protocol Manager
- Browser
- Network
- Tools
- Piece of the Puzzle

Specific Icon Functions and Uses

- Date and Time
- *Informix* Database
  - the amount of space per image resolution
  - Percentage of image database that is full
- Message Board
- Scanner Operations
- Protocol Manager
- Browser
- Network
- Tools
- Piece of the Puzzle

Specific Icon Functions and Uses

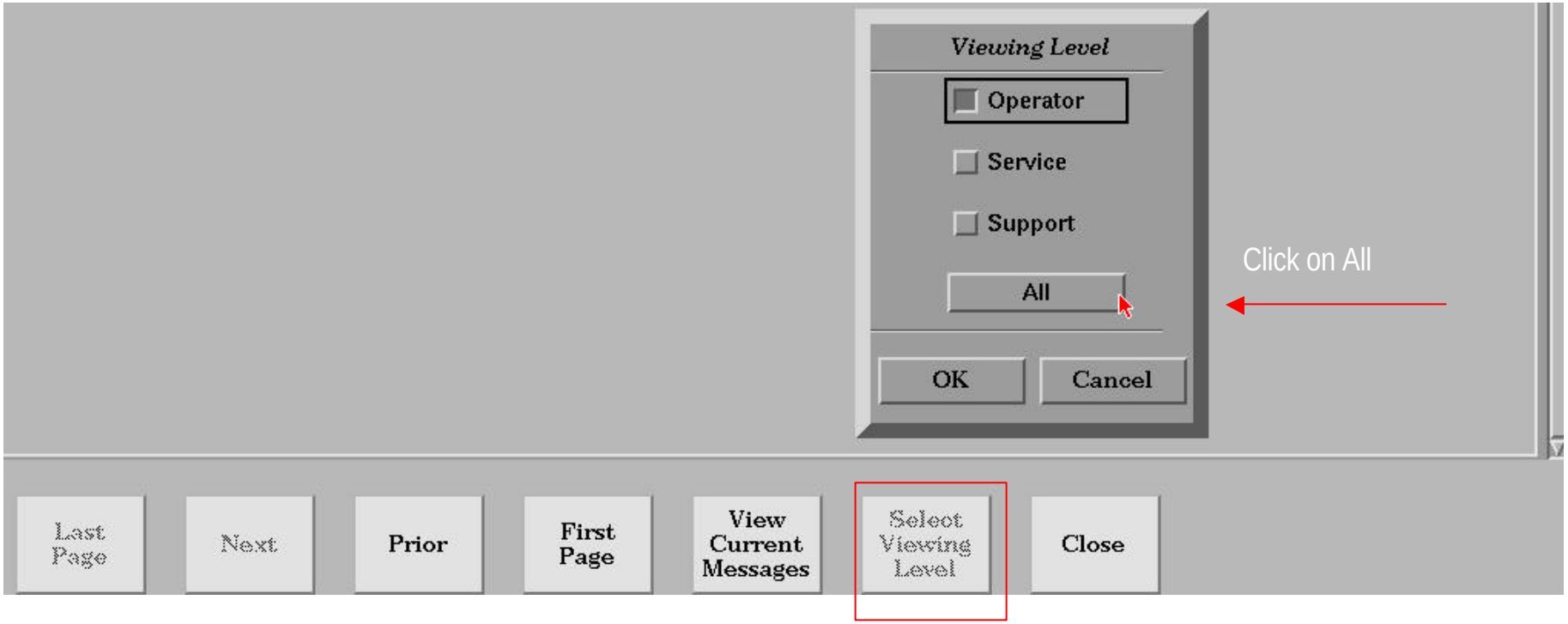


- Date and Time
- *Informix* database space

- Message Board
  - Error messages

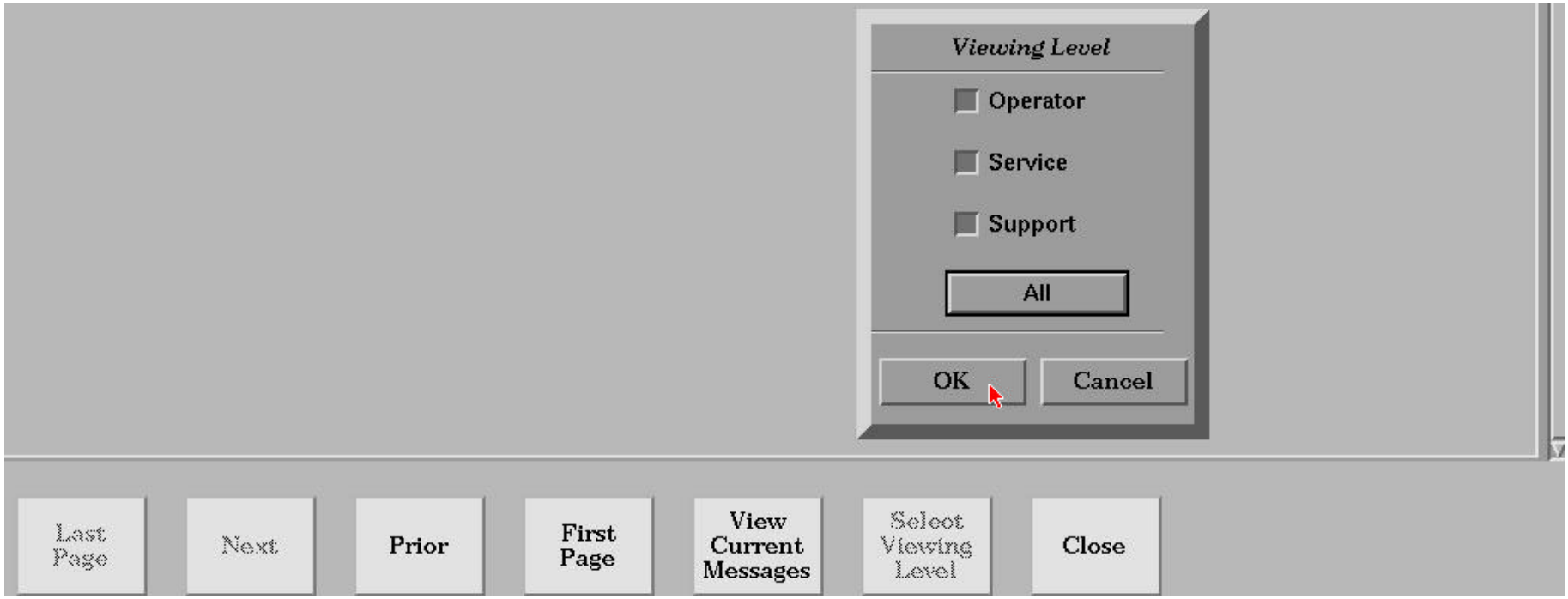
- Scanner Operations
- Protocol Manager
- Browser
- Network
- Tools
- Piece of the Puzzle

Selecting the Proper Message Level



- Click on the Message Window Icon
- Click on Select Viewing Level
- Click on ALL
- Click OK to close the window

View Message Window



- Click on the Icon_Message Window
- Click on “Select Viewing Level”
  - Click on All
    - Click OK

Example of an Error Message

File: ScannerState.c Line: 982
Internal software error has occurred in scanner state machine. The scanner cannot accept start scan event, when in refscanning state.

Mon Jun 10 15:21:34 2002
Host: fim3T Proc: scn Error: 2218616
File: ScannerState.c Line: 982
Internal software error has occurred in scanner state machine. The scanner cannot accept start scan event, when in refscanning state.

Mon Jun 10 15:21:36 2002
Host: fim3T Proc: scn Error: 2218616
File: ScannerState.c Line: 982
Internal software error has occurred in scanner state machine. The scanner cannot accept start scan event, when in refscanning state.

Mon Jun 10 15:21:38 2002
Host: fim3T Proc: scn Error: 2218616
File: ScannerState.c Line: 982
Internal software error has occurred in scanner state machine. The scanner cannot accept start scan event, when in refscanning state.

Mon Jun 10 15:21:43 2002
Host: fim3T Proc: NSP Error: 2225513
File: HPC_PORT_ID:spi_hpc_scan_ Line: 10
Attention: T/R driver in service, not product mode.

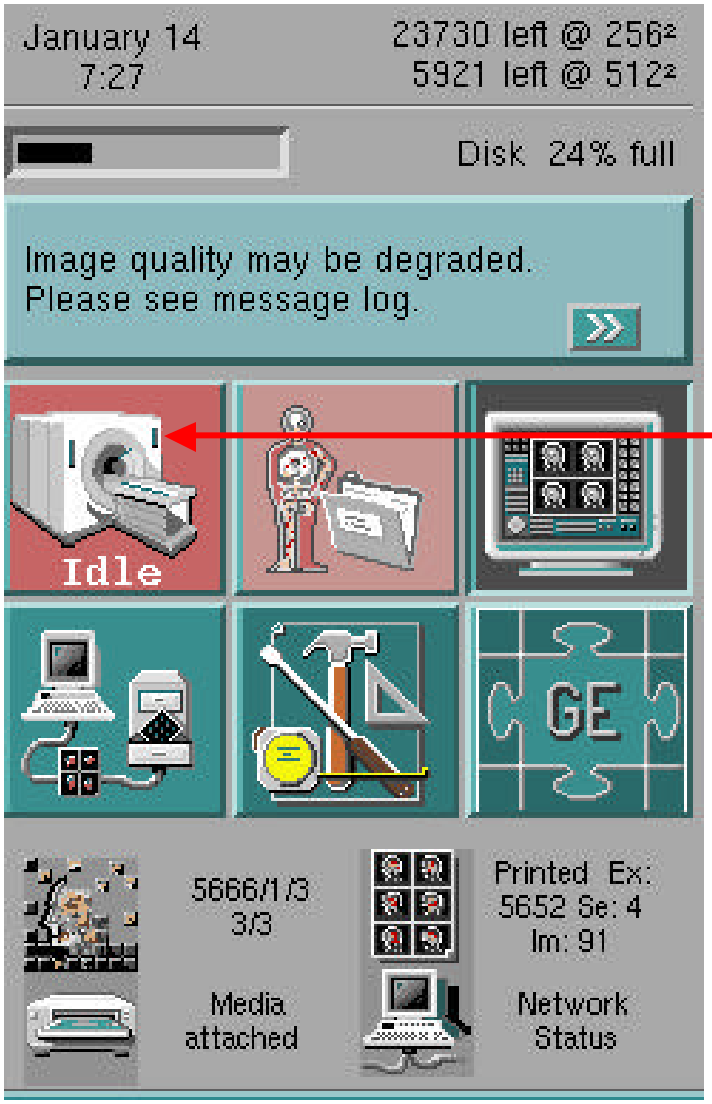
Mon Jun 10 15:22:21 2002
Host: fim3T Proc: NSP Error: 2224982
File: HPC_PORT_ID:hpc_pkt_retur Line: 100
Symbol lookup failed.
HPC received a memory read or load packet or return address packet
to access the symbol cont_recon_queu, which does not exist in the IPG symbol table.

Not Useful to keep trying to scan with this particular error message:

" *Internal Software Error*" …

Must reset TPS!

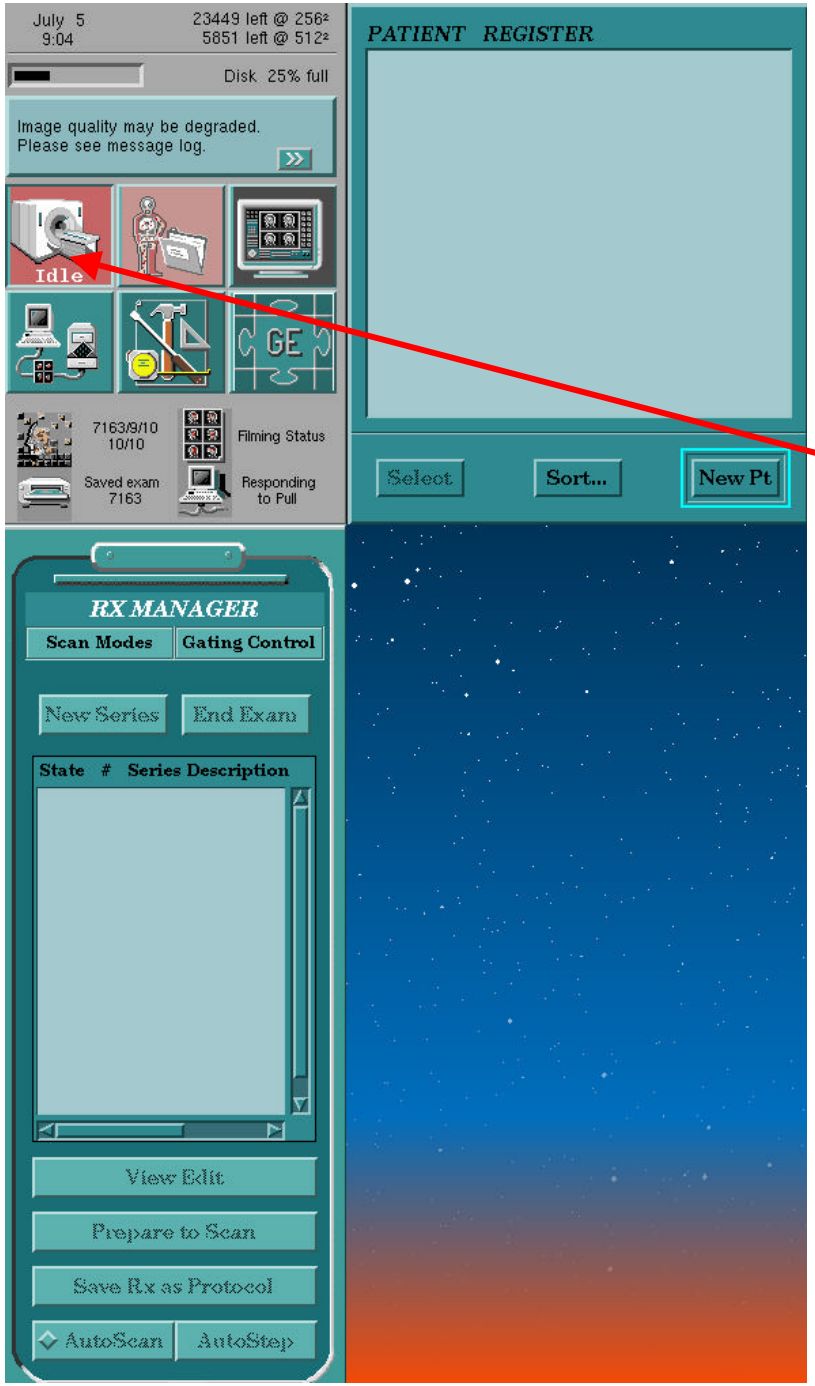
Specific Icon Functions and Uses



- Date and Time
- Informix space
- Message Board

- Scanner Operations
  - Patient Information
  - Protocol RX

- Protocol Manager
- Browser
- Network
- Tools
- Piece of the Puzzle



Scan Operations - Step 1

- Click on the Scan Operations Icon
  - “Idle”

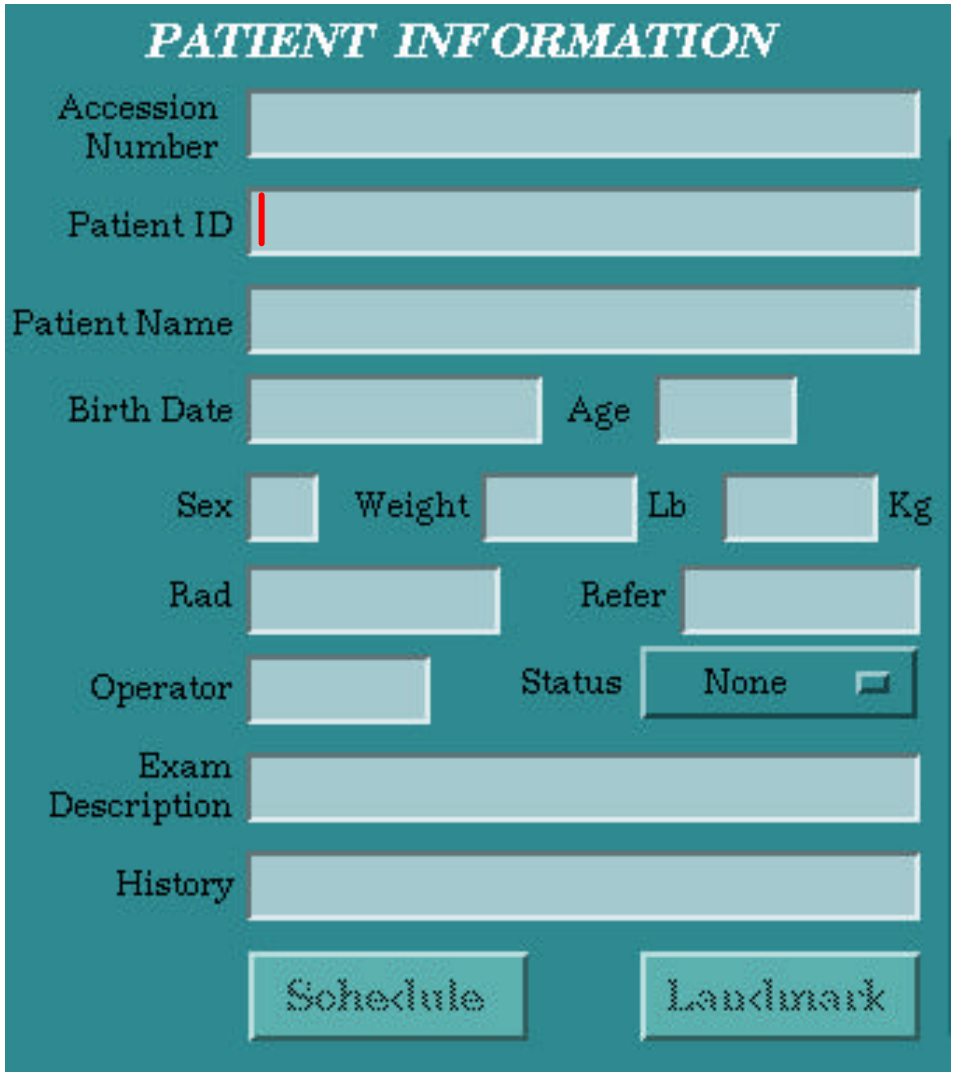
Scan Ops – Patient Register

- Click on:

  New Patient

Do NOT type in the Patient Register "white area"

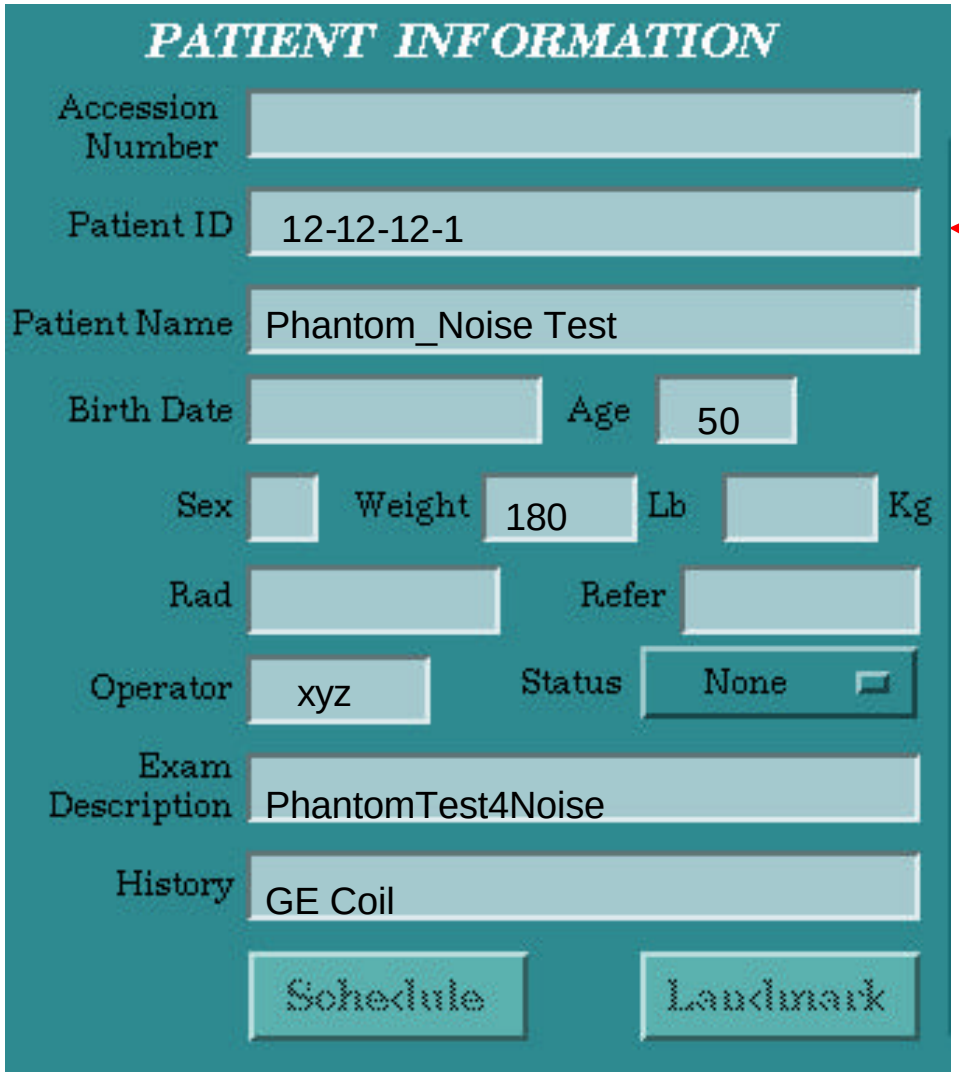
Scan Ops – Patient Information



- Click in the Patient ID Window
- Type in the MIS number

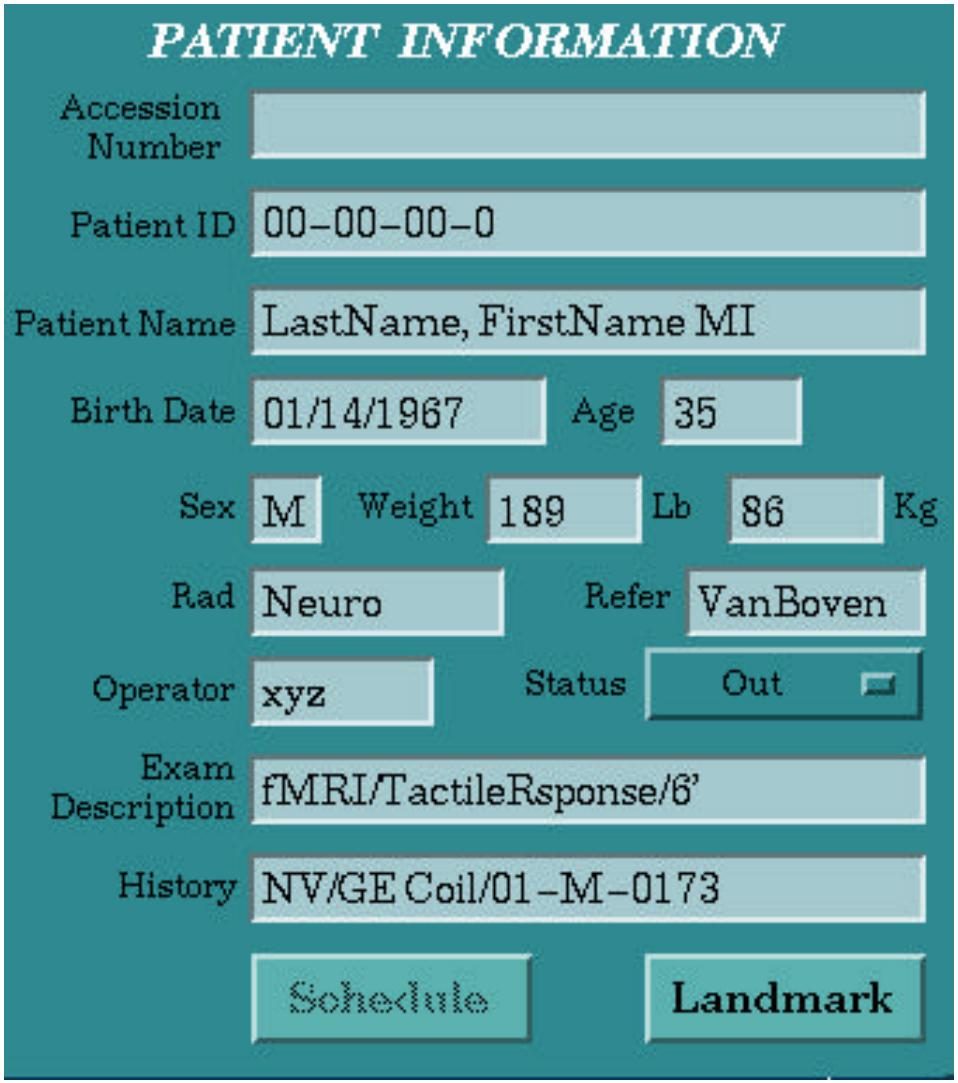
  Hit Enter
- Do NOT use the Accession Number for the 3T Scanners
  - Prefer not all Caps
  - Prefer not all Lower Case

Scan Ops – Phantom Information



- Click in the Patient ID Window
- the Date (and variations) is reserved for the QA studies
- Please use numbers e.g. 12-12-12-1
- Hit Enter
- Type in the necessary information
  - Use an adult weight

Patient Information

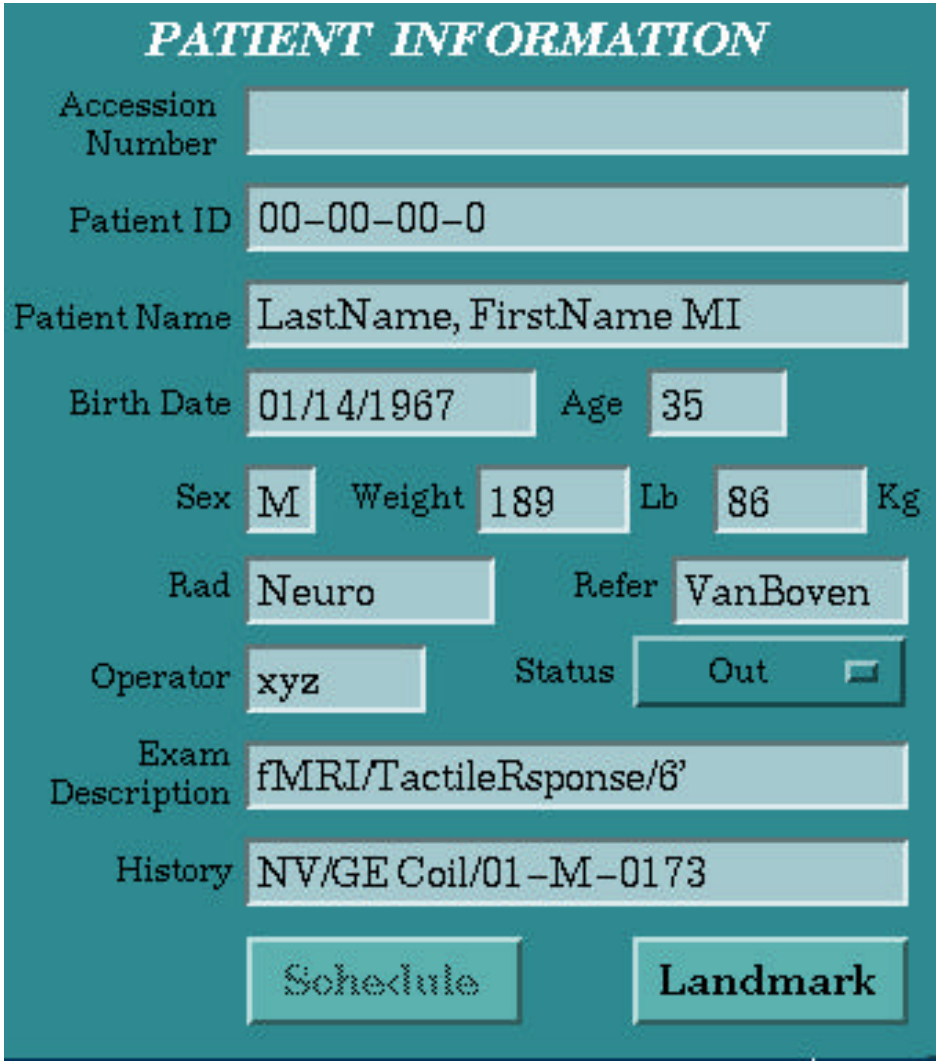


This information is considered legal documentation

- The name as in MIS

- The patient ID equals the MIS number (separated by a dash)

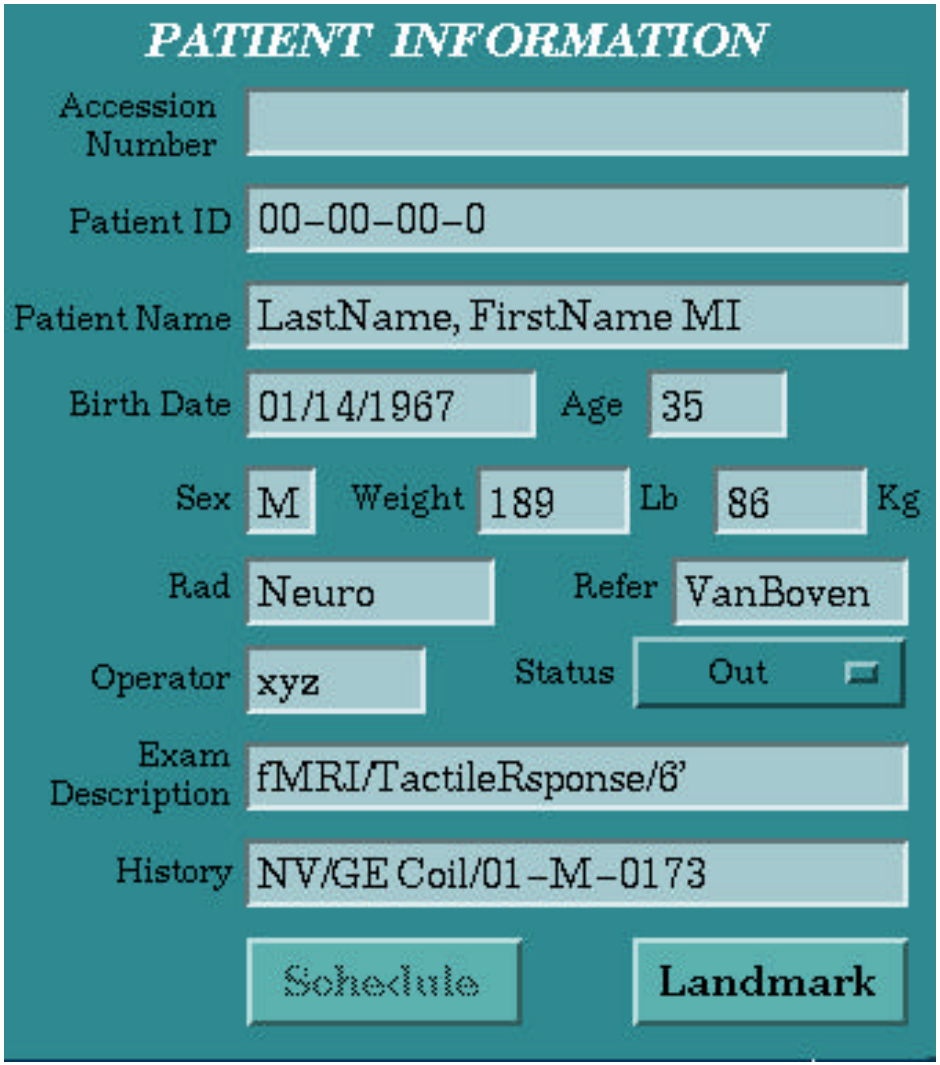
Patient Information_Name



This information is considered legal documentation

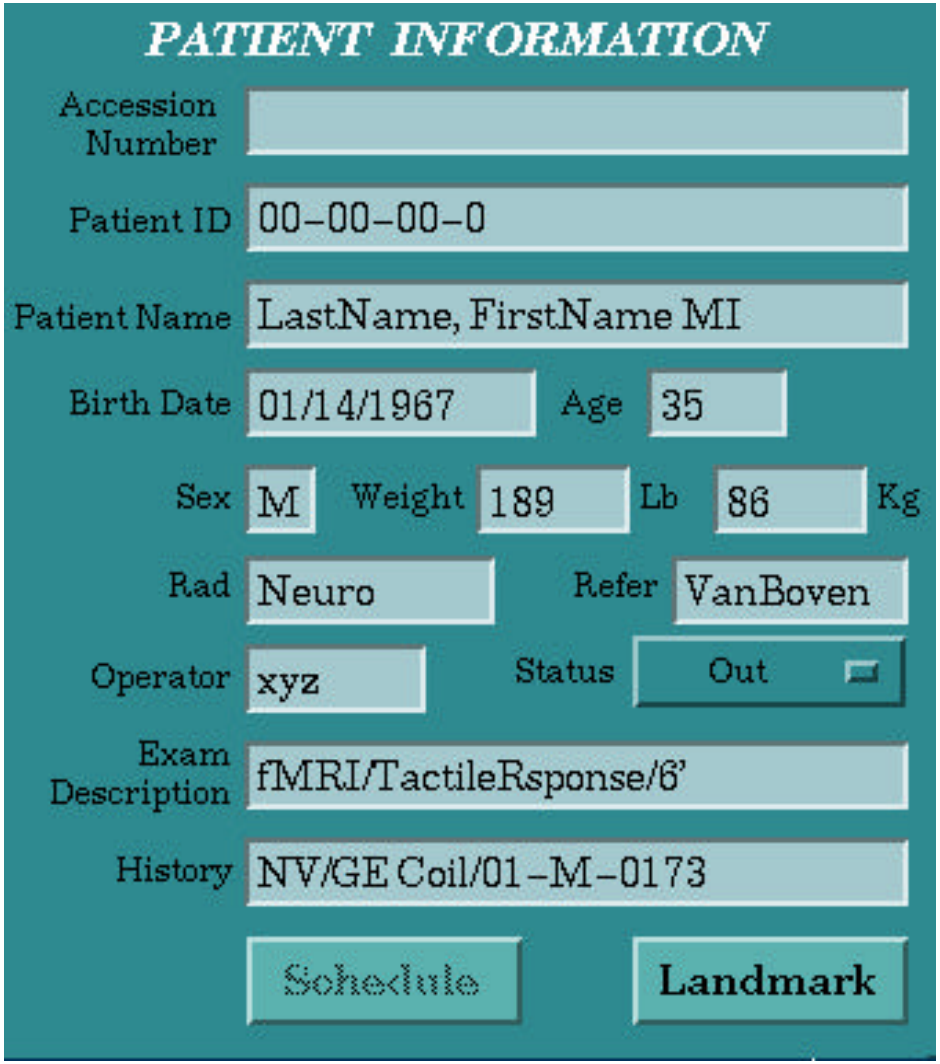
- The patient ID equals the MIS number (separated by a dash)
- The full and legal name as listed in the MIS system
  - Must be spelled correctly
  - No way to correct after download
  - Last Name, First Name MI
  - No name abbreviations e.g.,
    - Pete for Peter, Dan for Daniel

Patient Information_Other Information



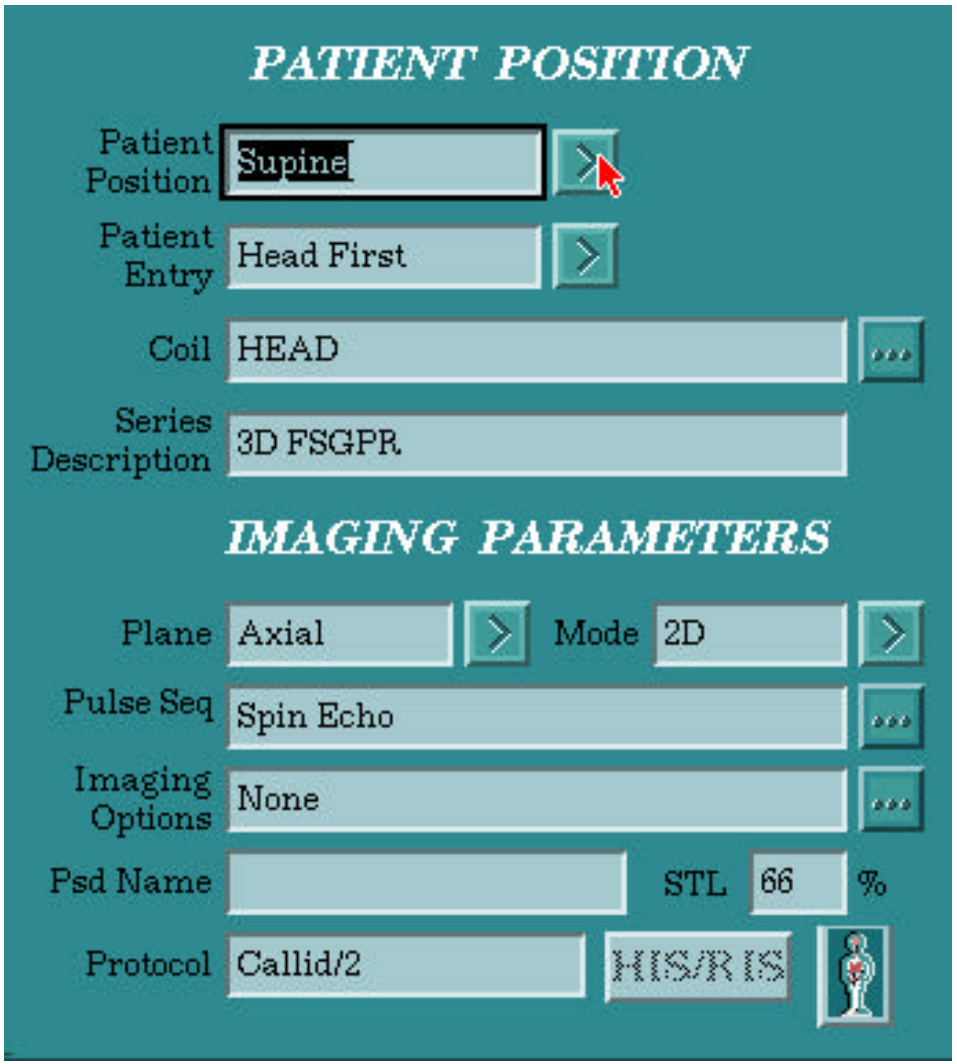
- *Birth Date:*
  - enter the correct date or the actual age
- *Weight:*
  - enter in Lbs or Kgs
- *Rad* (Radiologist)
  - enter Neuro
- *Refer:*
  - The referring physician
- *Operator:*
  - The scan operator's initials
- *Status:*
  - Using RMB
    - In (in-patient)
    - Out (out-patient)

Patient Information



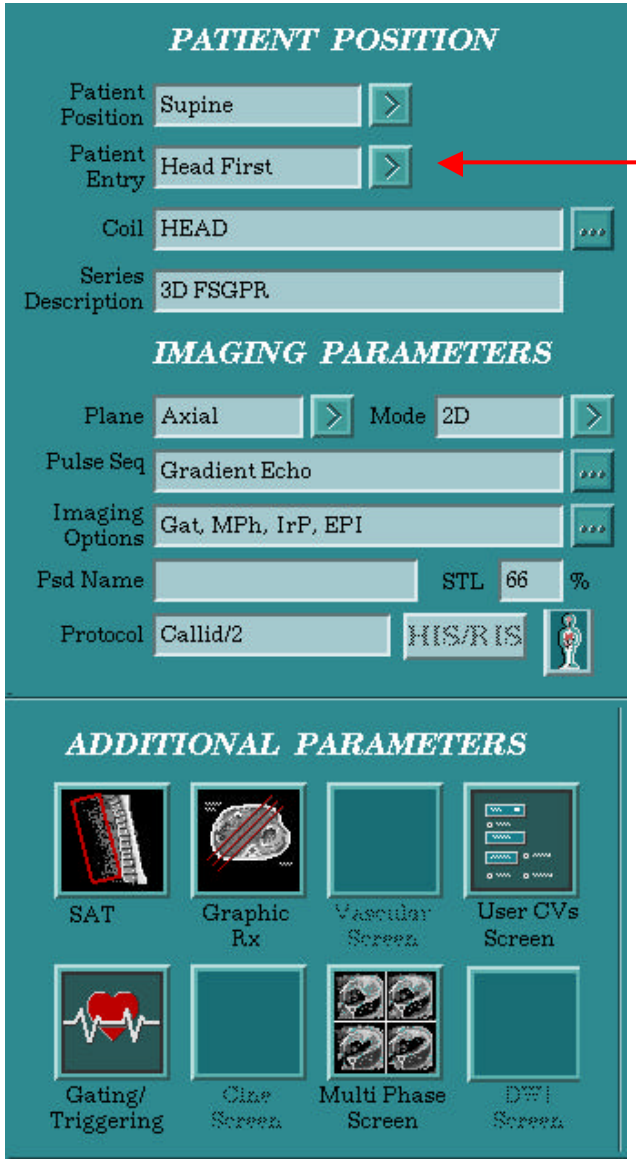
- *Exam Description:*
  - what type of exam be performed
  - adding the height allows for calculation of BSA
- *History:*
  - Brief patient HX
  - Coil type
  - Scanning IRB protocol #

Scan Ops – Patient Position



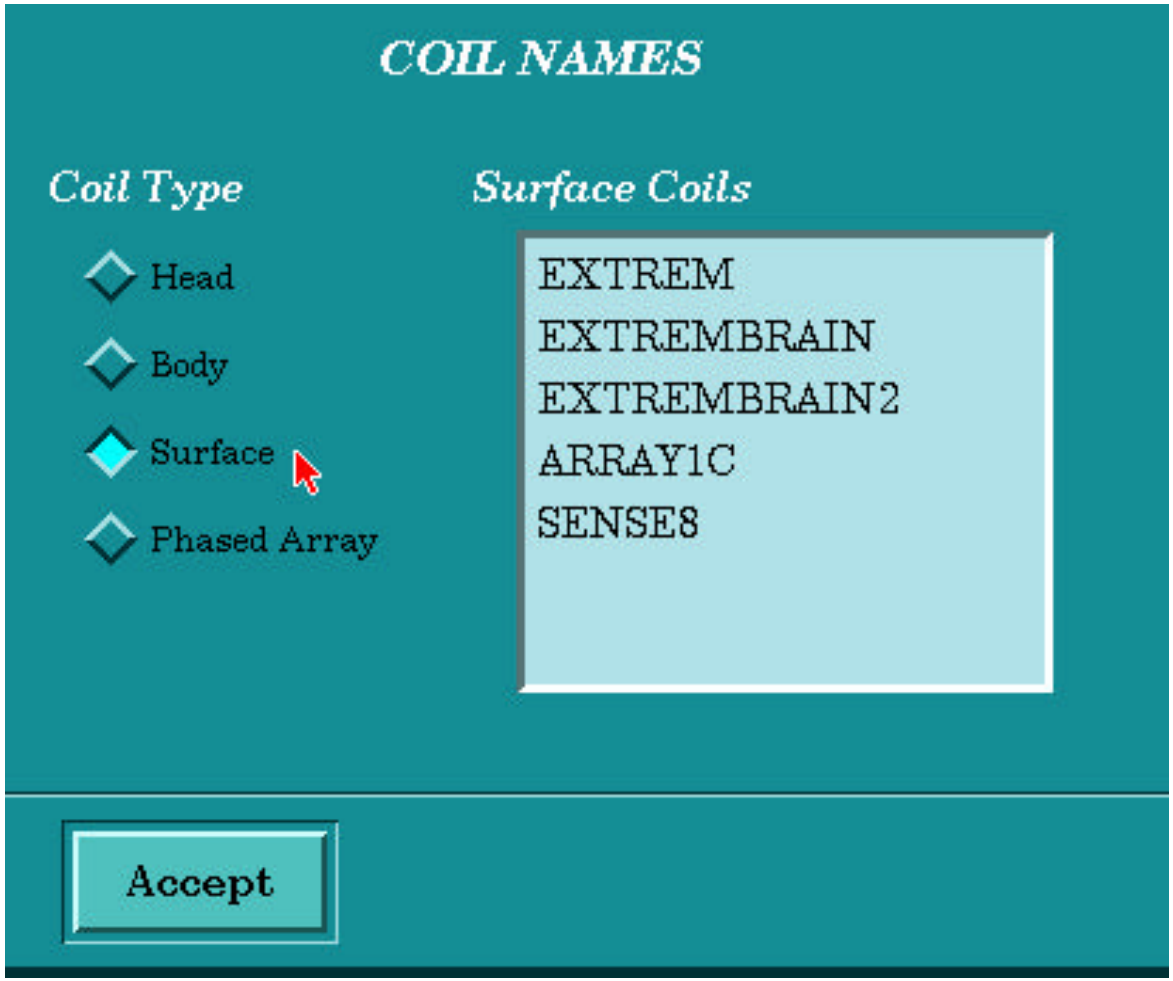
- Click on Patient Position
- Click on the drop down menu
  - Supine
  - Prone
  - Right Decubitus
  - Left Decubitus

Patient Position – Patient Entry



- Patient Entry
  - Head First
  - Feet First
- Important because data/images will be marked incorrectly
  - Inferior for Superior
  - Right for Left
  - Posterior for Anterior

Coil Selection

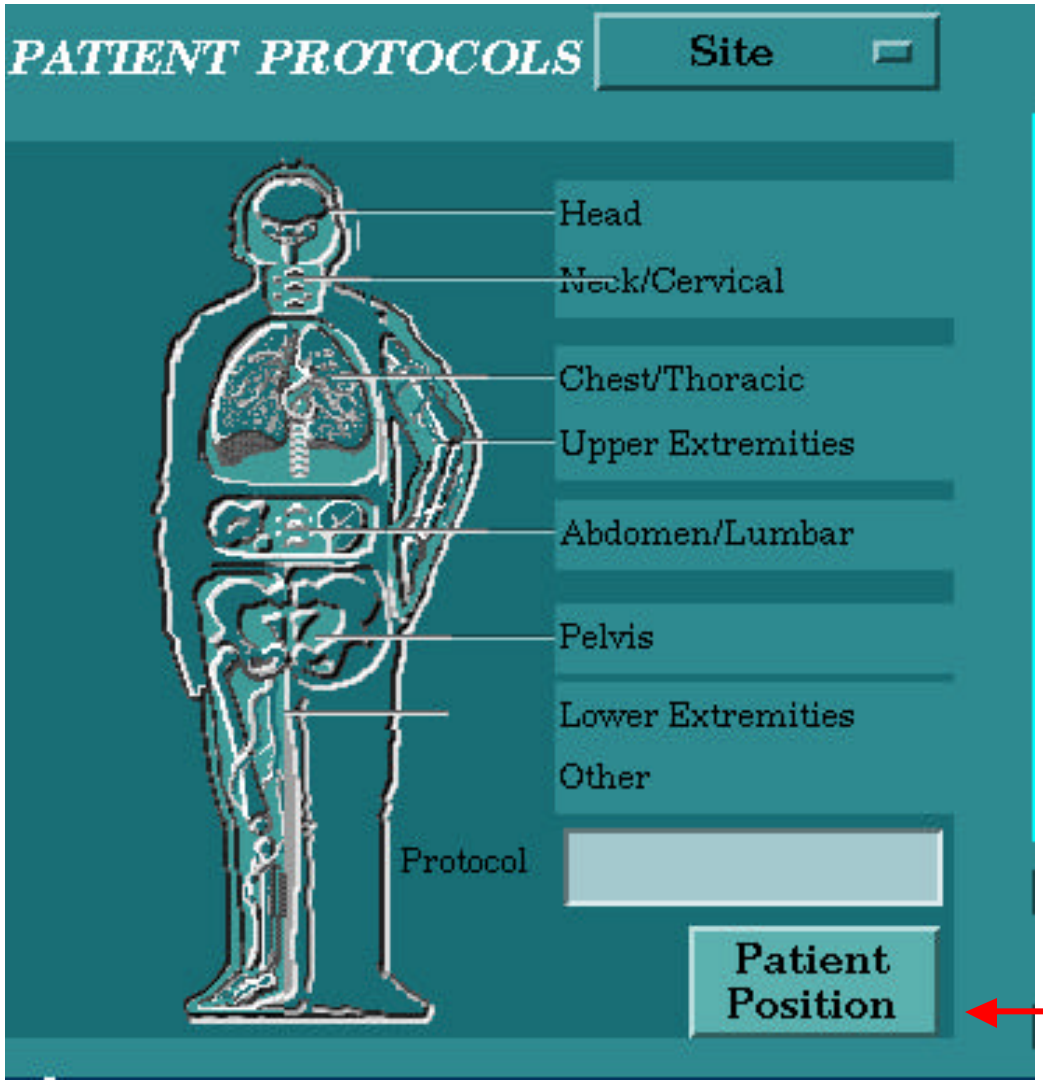


- Click (lmb) on the correct coil type and coil name
  - (if necessary)

e.g.

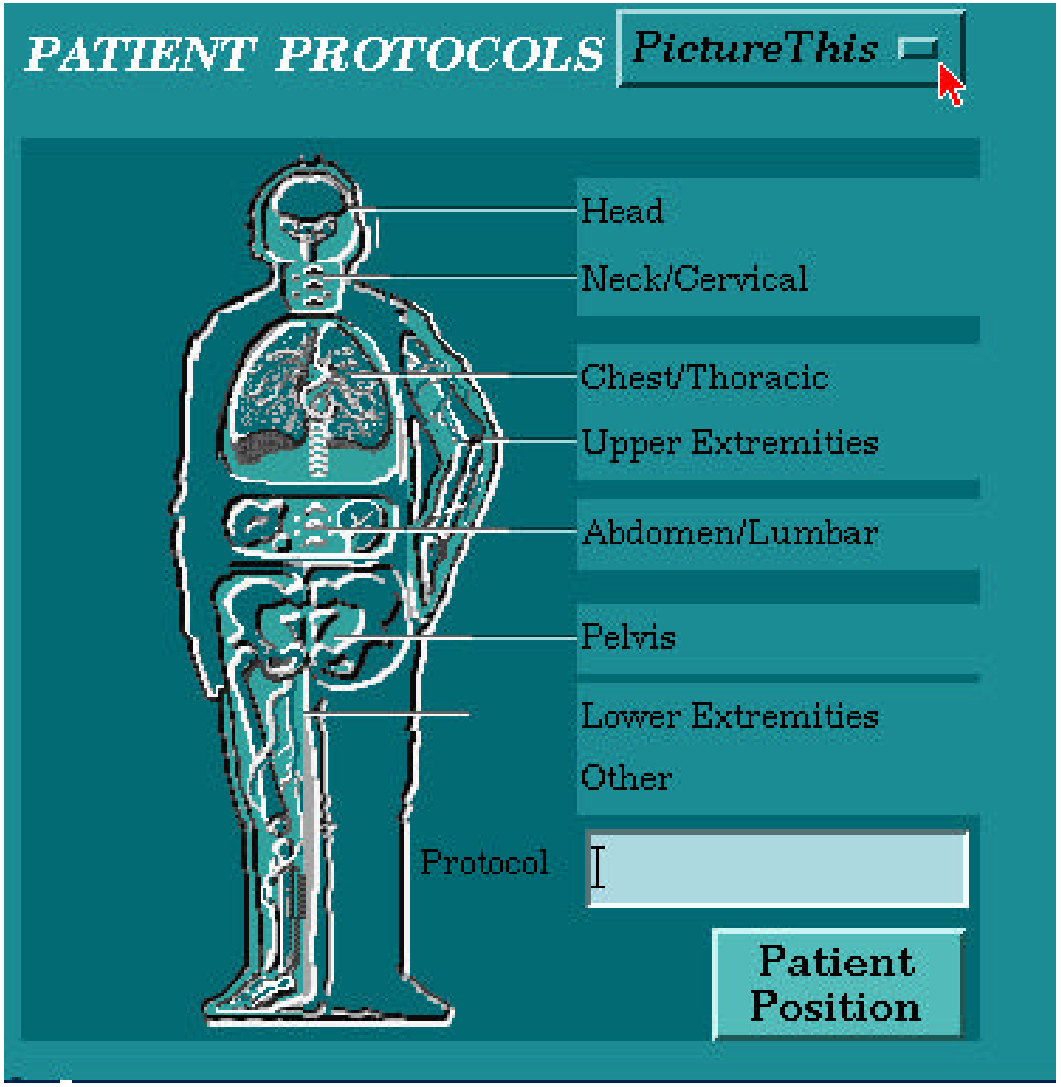
Surface Coil
- Sense8

Patient Protocol Window



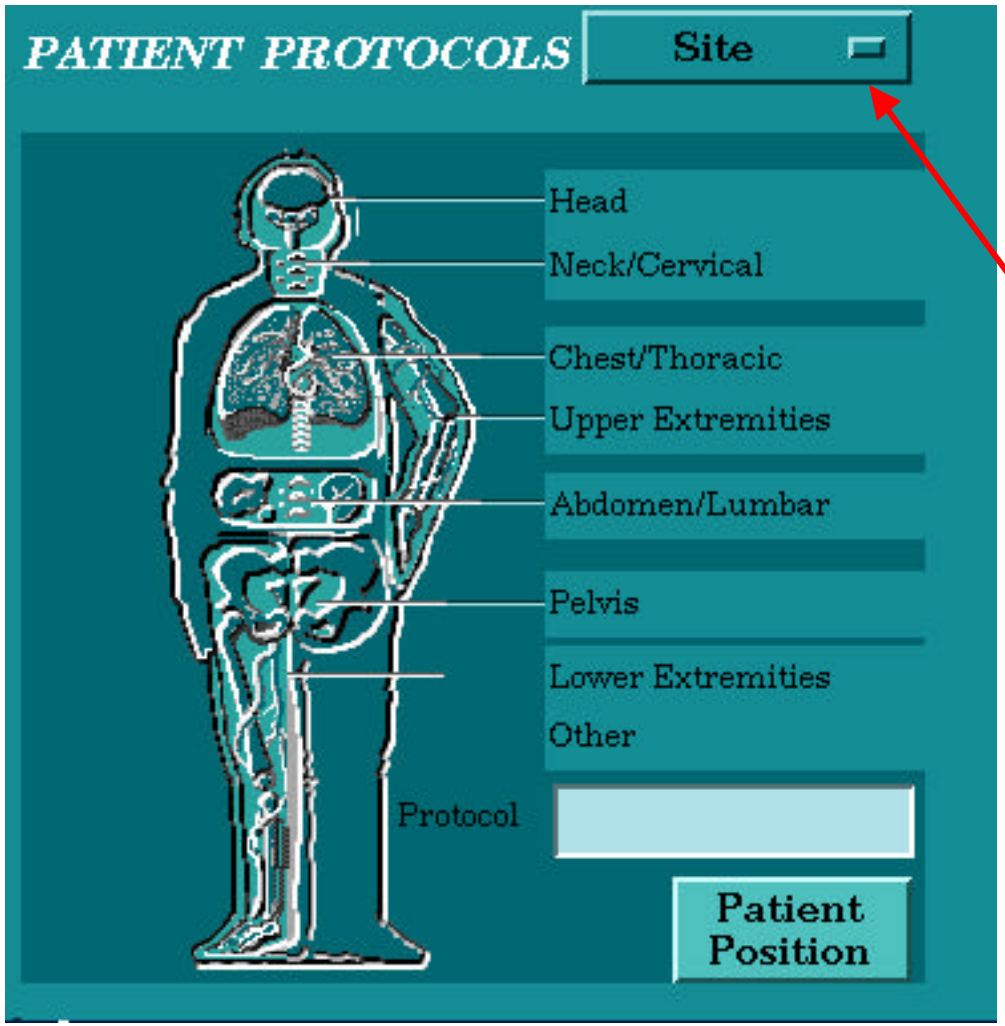
- Use pre-saved protocols from the anatomy “cookbook”
- Build protocols from scratch using the *Patient Position* button

Patient Protocols_Picture This



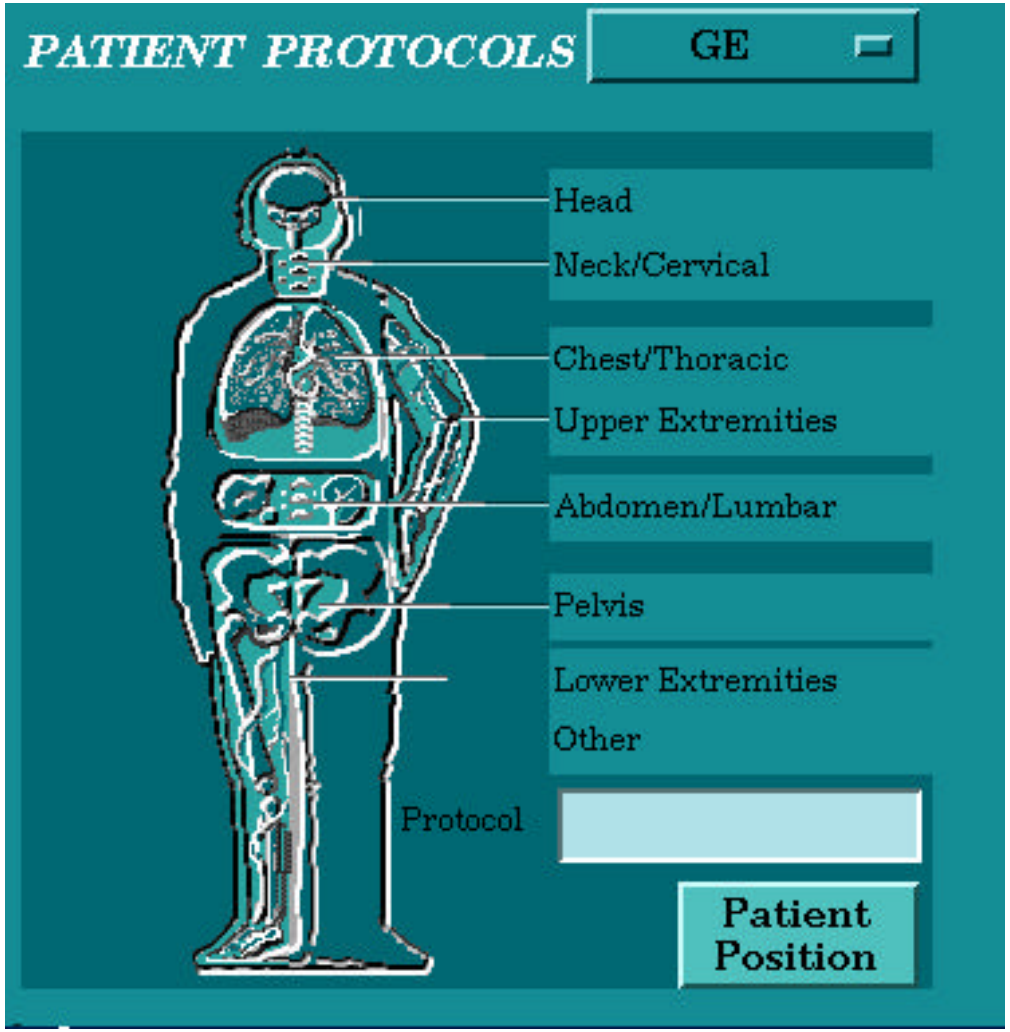
- *Picture This* is the default setting after a scanner shutdown
- Point to a Body Part for for specific protocol
  - (not the same as pre-saved Site protocols)

Patient Protocols_Site



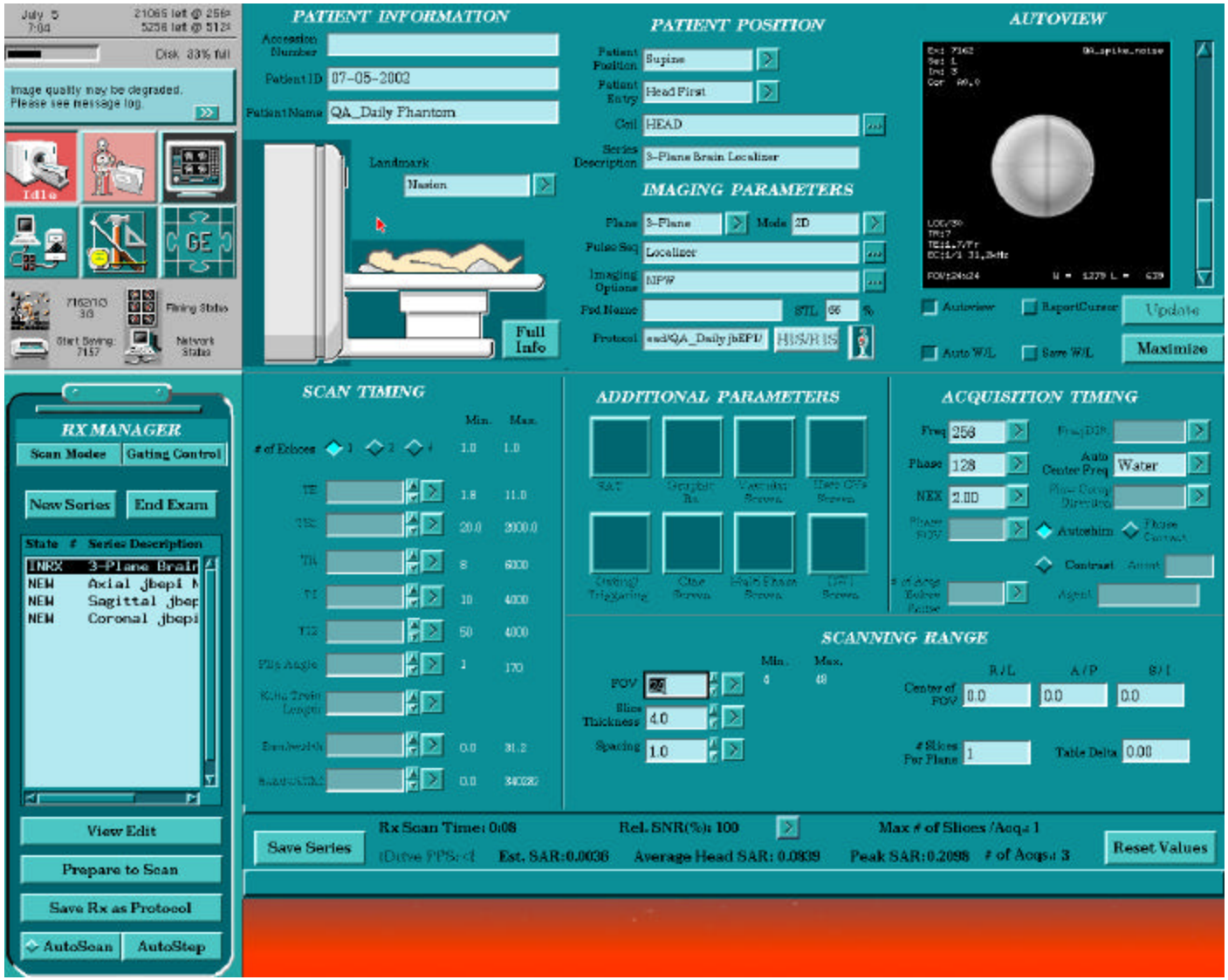
- Specific Protocols that were developed and saved “on site”
- Site
  - The saved protocols from “our” 3T Users
    - QA_Daily Phantom
    - MR Venogram
    - Dpine_Adolescent Study

Patient Protocols_GE



- Protocols GE pre-loaded
- Listed by body part and type e.g.
  - Head, Vascular
  - Head, MS with Contrast
  - Etc.

Scan Operations Page

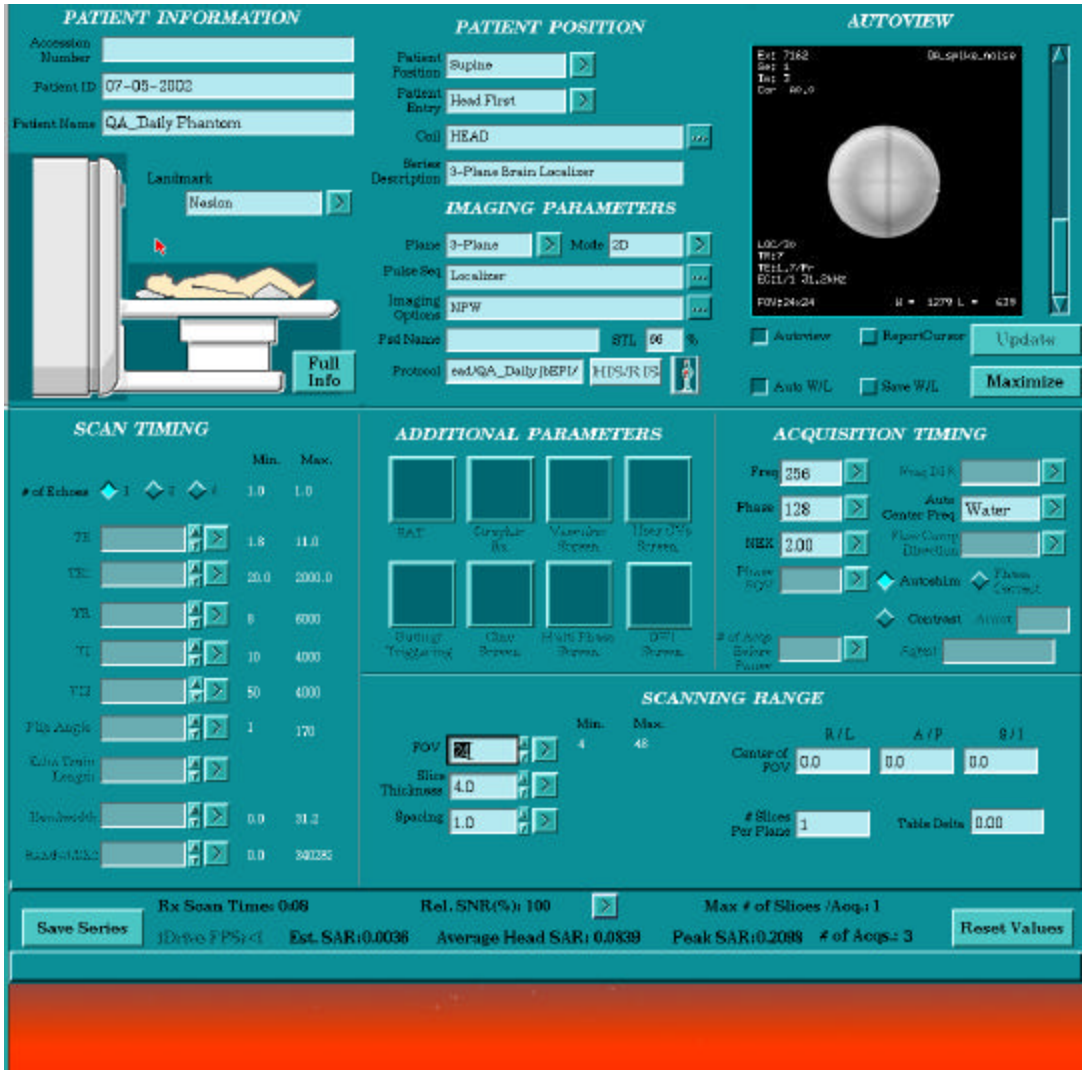


- The way it looks after the Patient information is entered

and

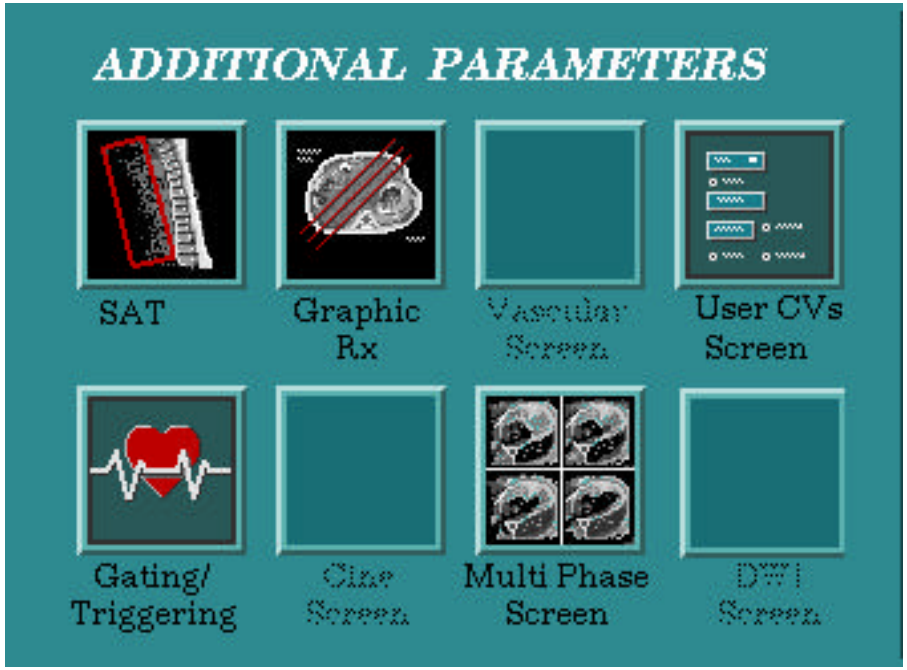
- After a“Cookbook”protocol has been selected

Scan Ops - Scan Timing



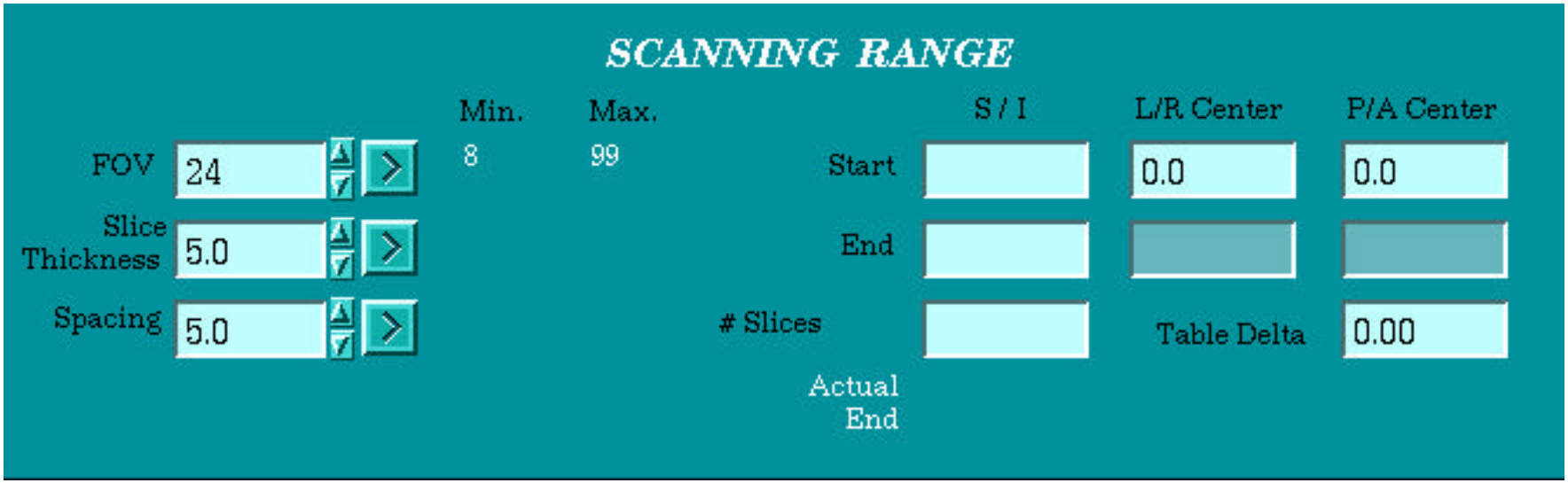
- Ready for input:
- Scan Timing
  - TR,TE,Flip,ETL,BW
- Additional Parameters
  - Sat, GRx, CV's etc
- Acquisition Timing
  - Matrix, Nex etc
- Scanning Range
  - FOV
  - Slice thickness
  - Slice spacing
- Save Series

Scan Ops – Additional Parameters



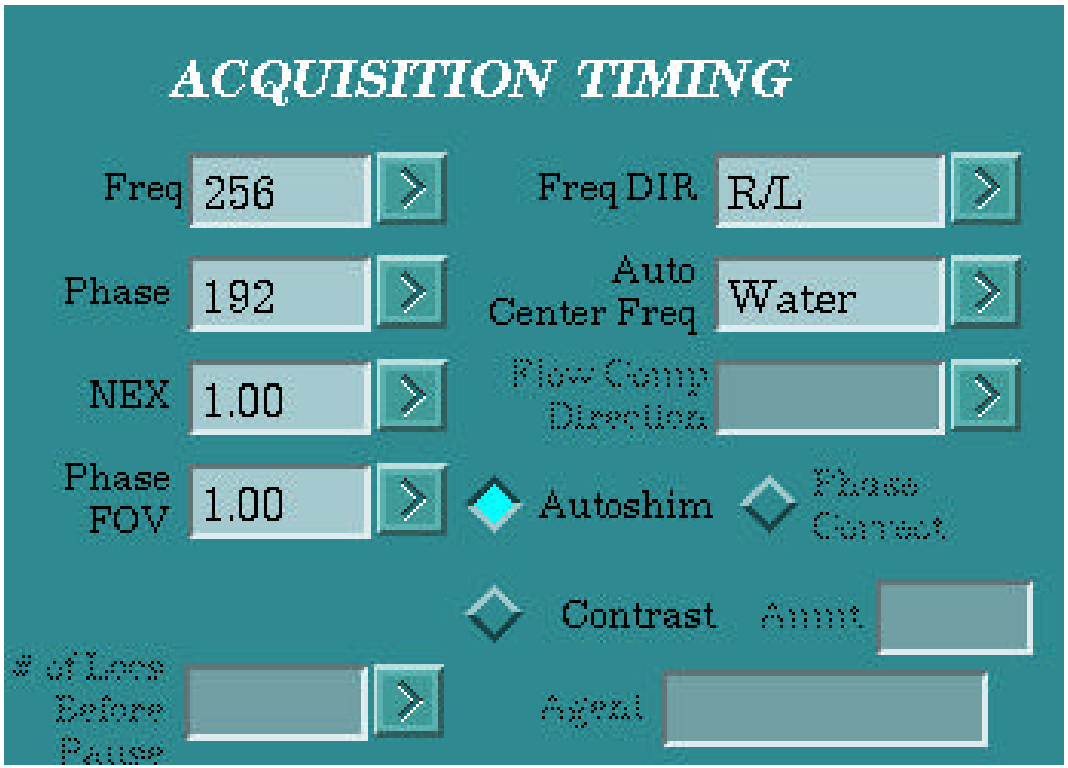
- Ready for the next steps
  - SAT
  - Graphic RX
  - Vascular Screen
  - User CVs
  - ECG
  - CINE
  - Multi-phase
  - DWI Screen

Scan Ops – Scanning Range



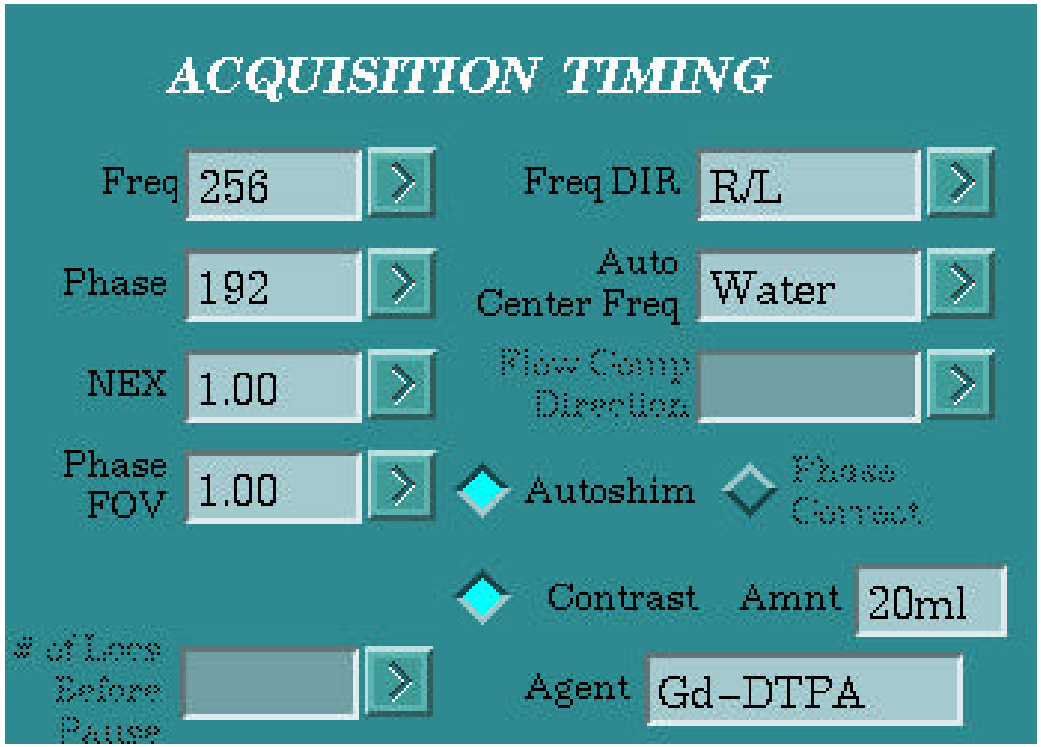
- Type or click drop-down menu
  - FOV
  - Slice Thickness
  - Scan Spacing
- Type-in or use Grx RX option
  - S/I
  - L/R
  - P/A

ScanOps - Acquisition Timing



- Click on drop down menus
  - Freq Direction(X)
  - Phase Direction (Y)
- NEX
- Phase FOV
- Freq DIR
  - SPF
- Center Freq on Water
- AutoShim
- Phase Correct
- Contrast
- # of locs before pause
  - Breath-holds

Acquisition Timing + Contrast

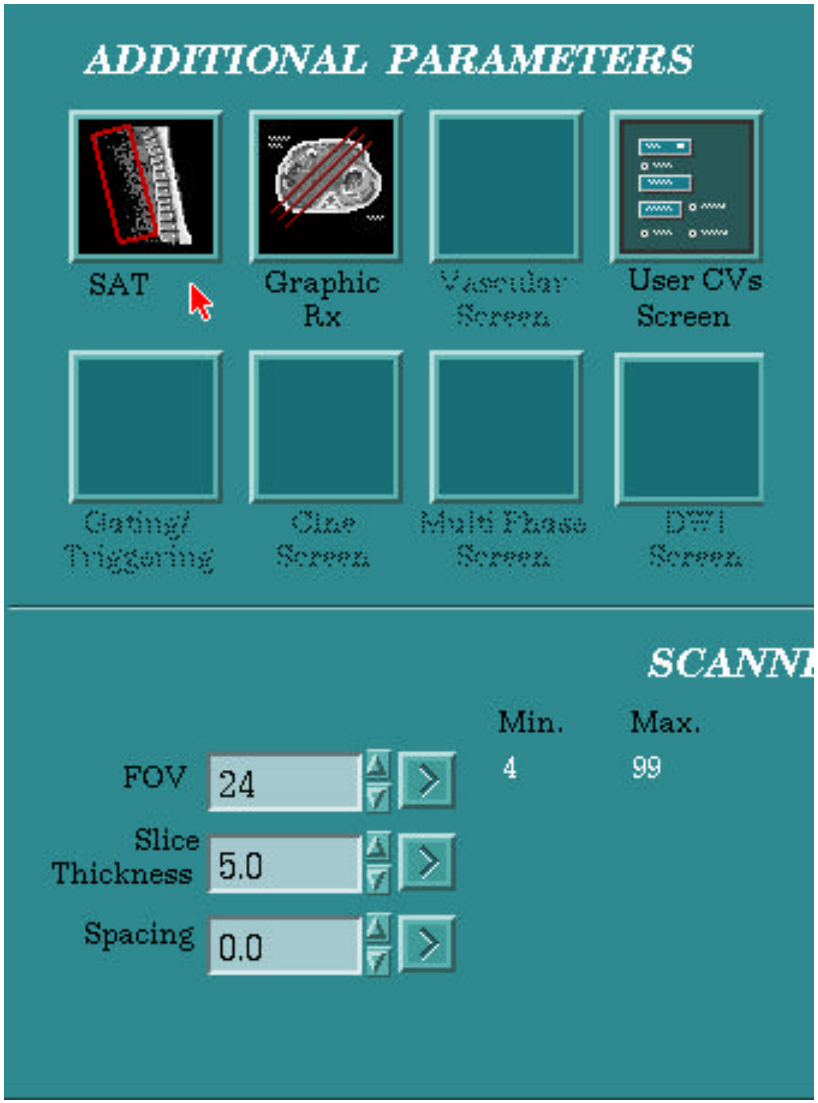


- Click on Contrast
  - Type in amount to be given
  - Type in the Agent

Using Fat Sat Suppression

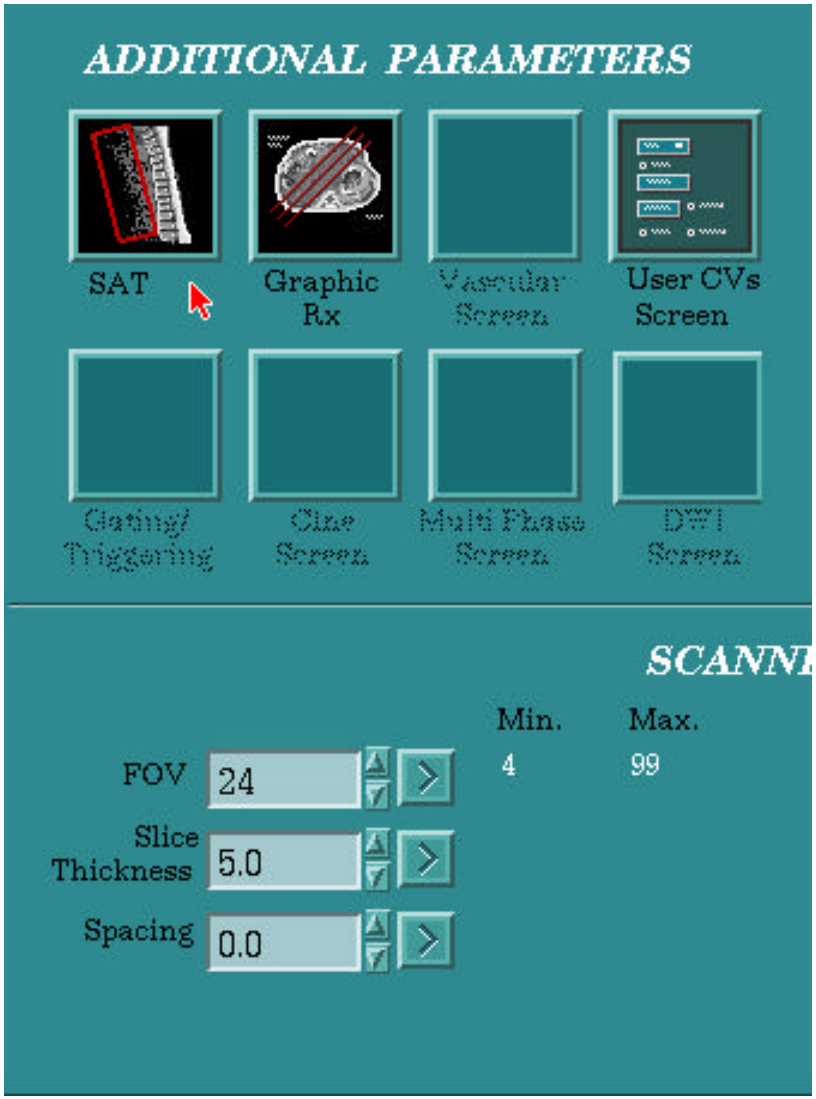
- GE AutoShim
  - Click on AutoShim in the Acq Timing Window
- High Order Shim
  - Use the EPI Scan Locations
  - ShimCalc
    - Do not move table

Adding A Sat Band (AKA Fat Sat)



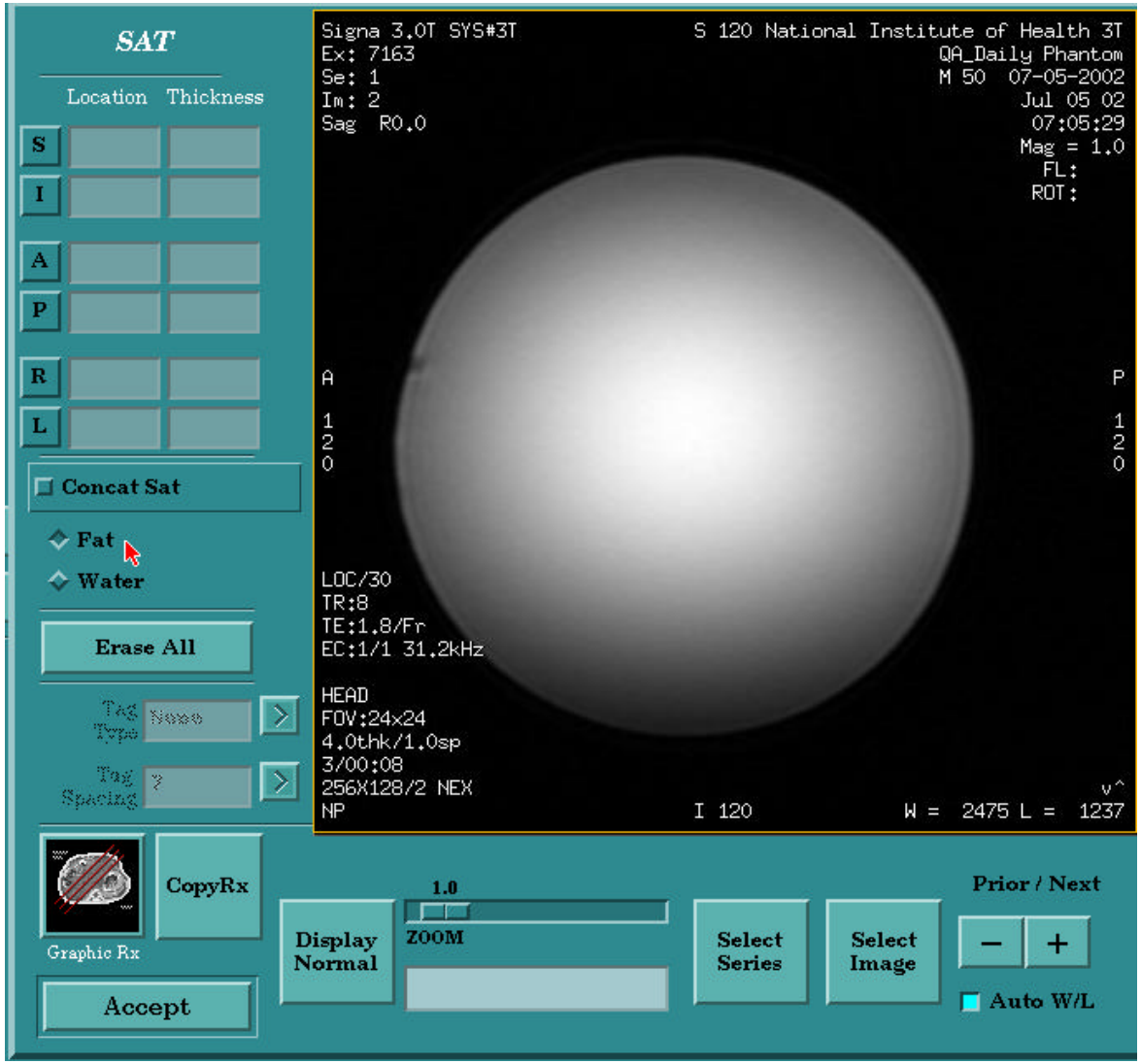
- In the Additional Parameters Window of Scan Operations Page
  - Click on the SAT icon

Using Fat Sat_Step 1



- Click on the SAT icon
  - (after typing in scan locations or using the GrxRX option)
  - Located in the Additional Parameters Area

Using Fat Sat - Step 2

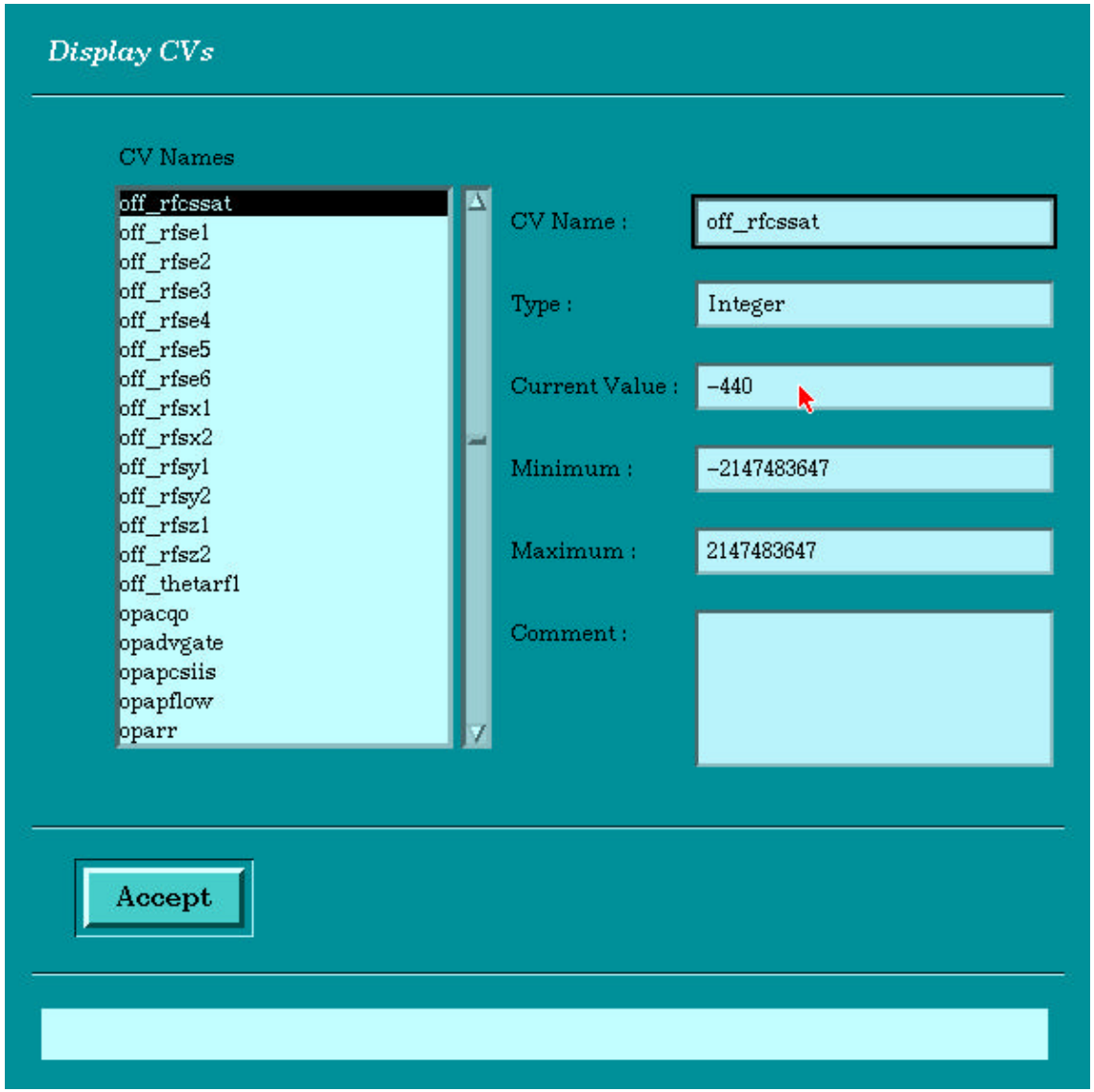


- Click on Fat in the SAT window
  - * Click On and Off and then ON

(* Tech Trick)

  - Click Accept

Using Fat Sat – Check Offset



- Research Options
- Display CV's (rmb):
  - After series download
  - Do not confuse with User CV

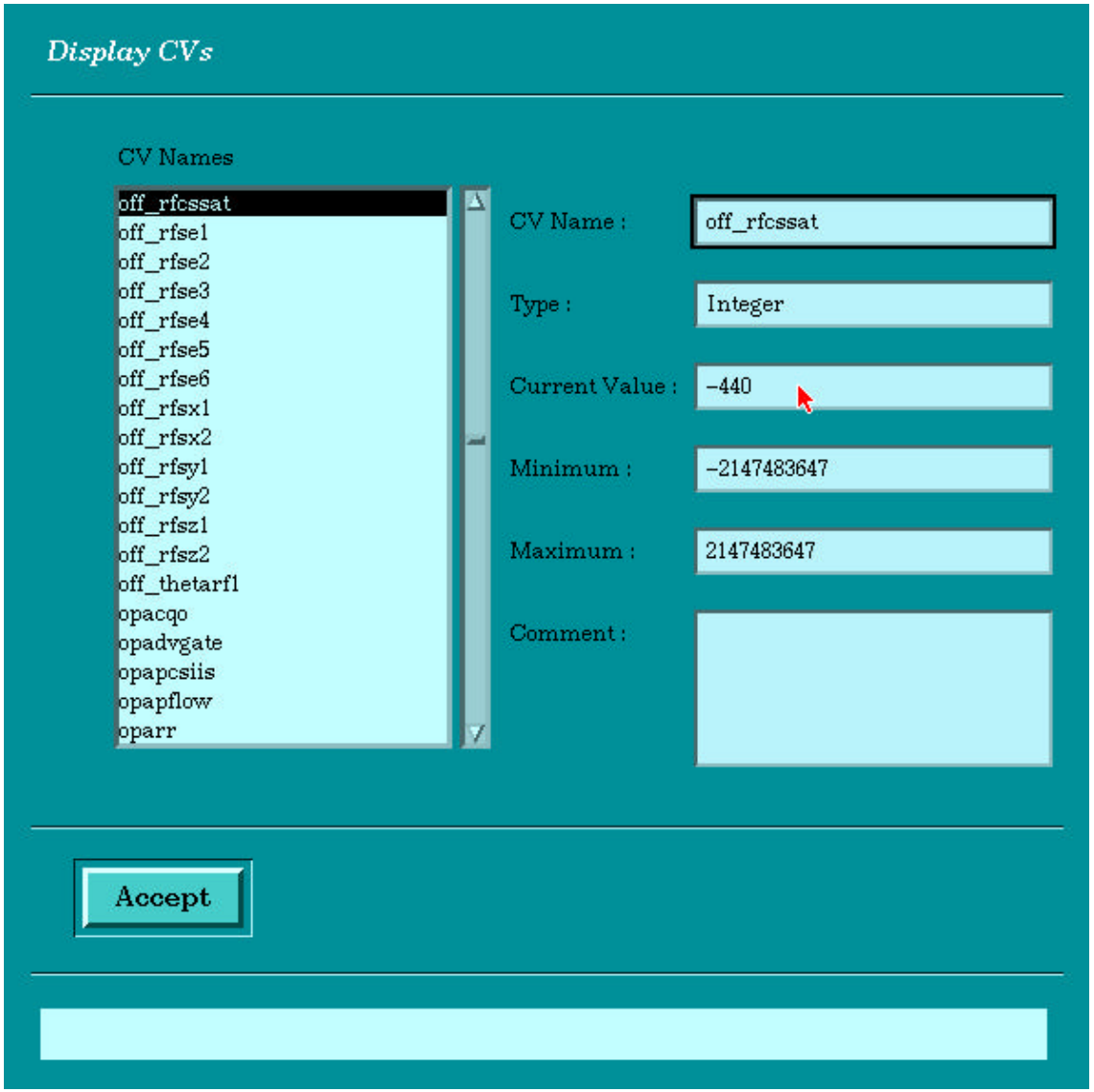
- Type in value:

  off_rfcssat

  - - 440 (@ 3 T)
  - - 220 (@ 1.5 T)

- Use rmb and click on Download
  - Click on Accept

Using Fat Sat - jbEPI Option-Step 1

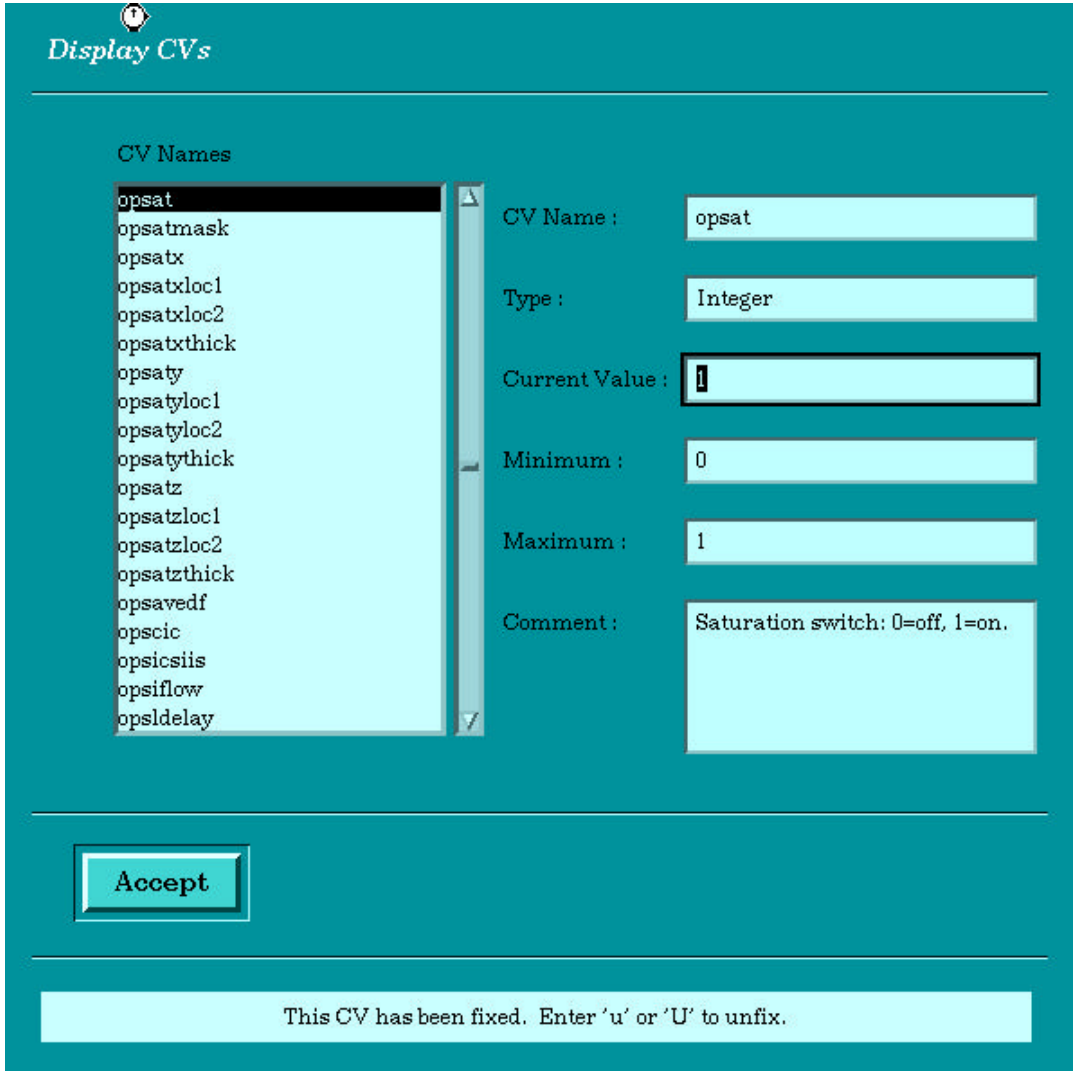


- jbEPI (NIH EPI)
- Research Options Display CV's (rmb):
  - After series download
  - Do not confuse with User CV
- Type in value:

  off_rfcssat

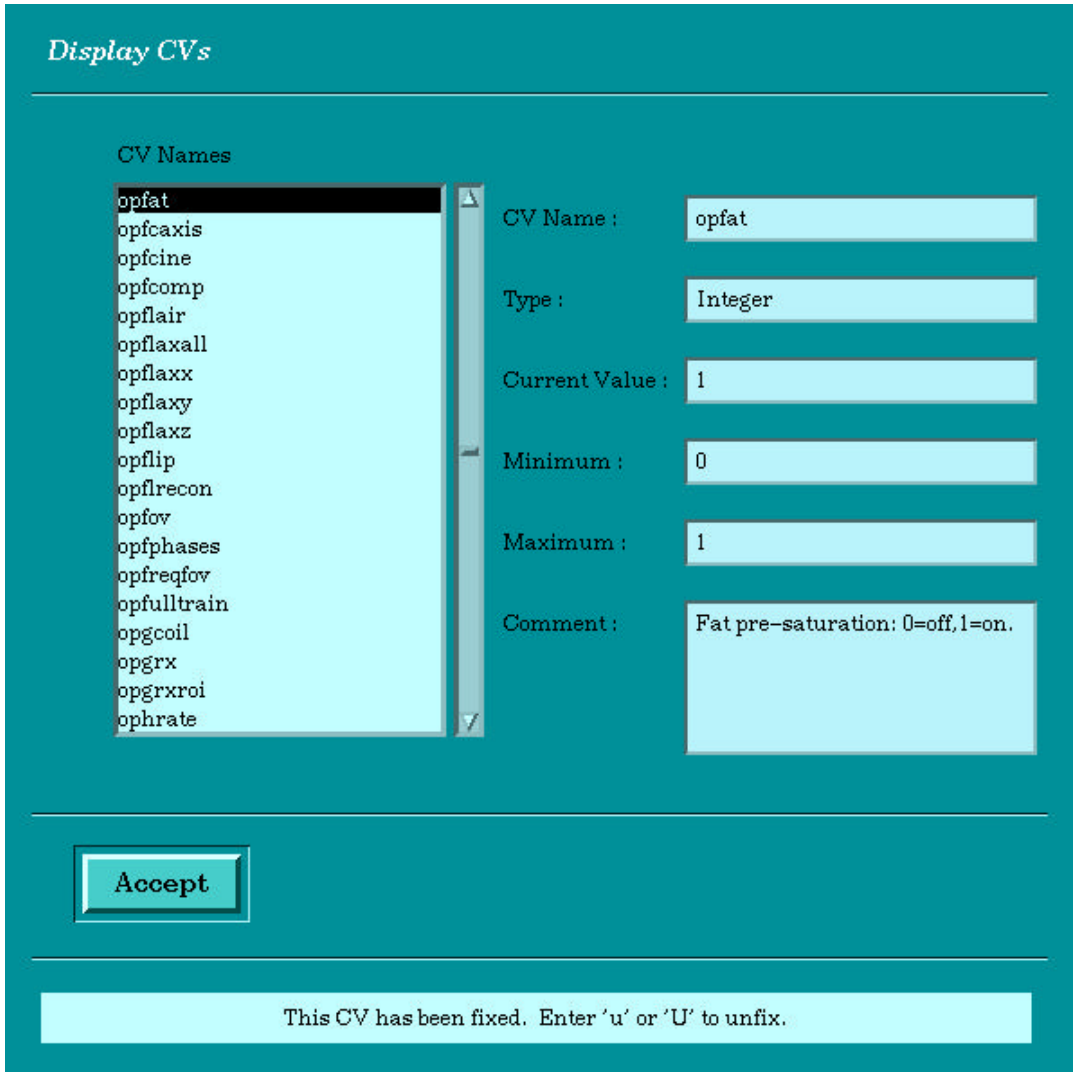
  - 440 (@ 3 T)
  - 220 (@ 1.5 T)

Using Fat Sat - jbEPI Option-Step 2



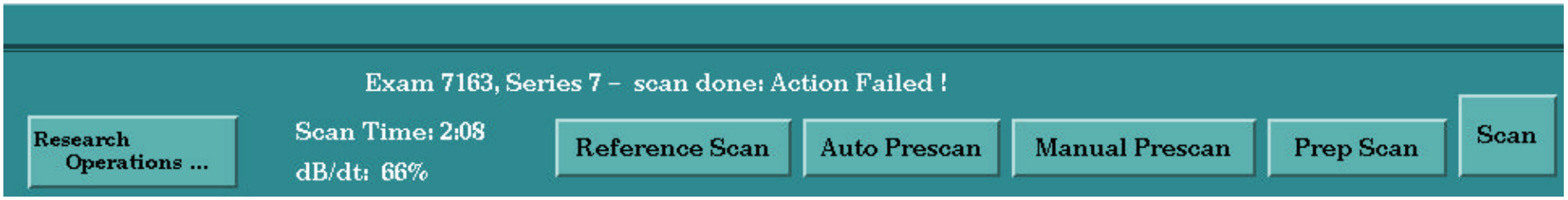
- jbEPI (NIH EPI)
  - Turn on opsat
    - 0 = off
    - 1 = on

Using Fat Sat - jbEPI Option-Step 3



- jbEPI (NIH EPI)
- Turn on opfat
  - 0 = off
  - 1 = on
- Use rmb and click Download
- Click on Accept

GE Real Time EPI Error Message with the Fat Sat Option

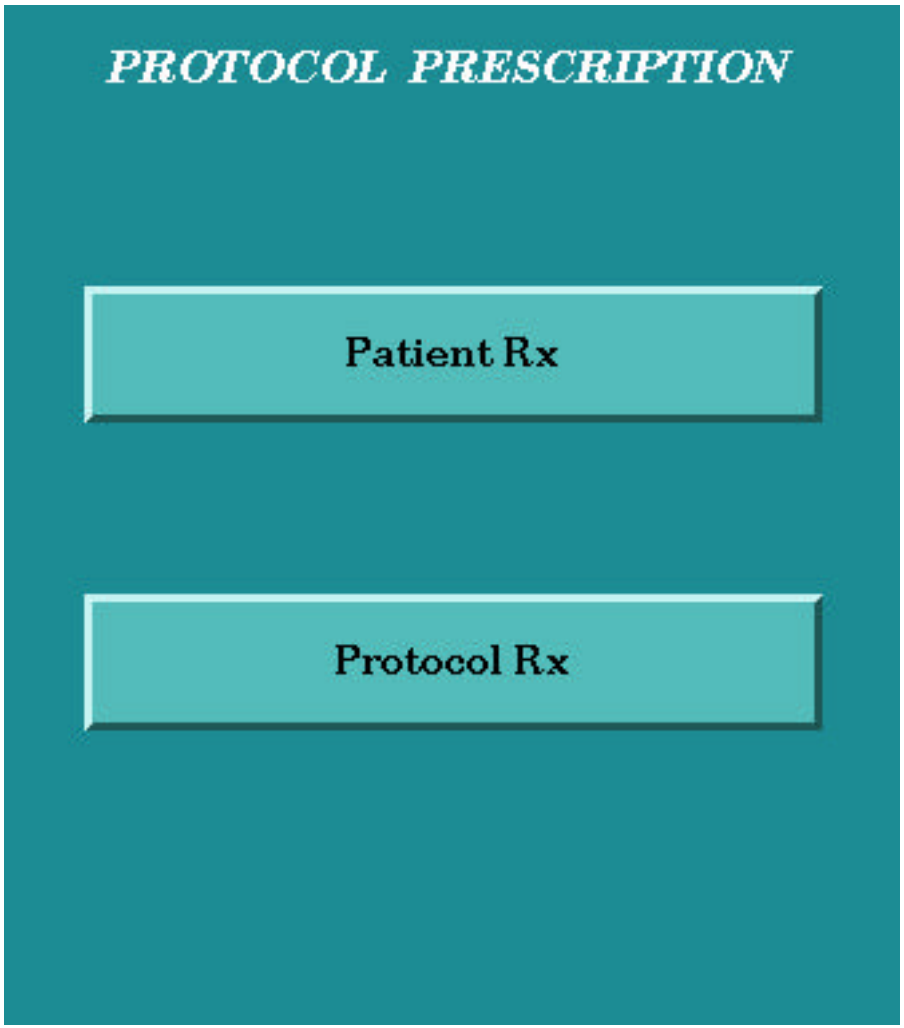


- Typical error message when using GE RT
  - May be indicating to check Fat Sat status
    - (normal error) Important!
  - May be real error
    - Prescan errors
    - Software error
      - Reset TPS

Specific Icon Functions and Uses

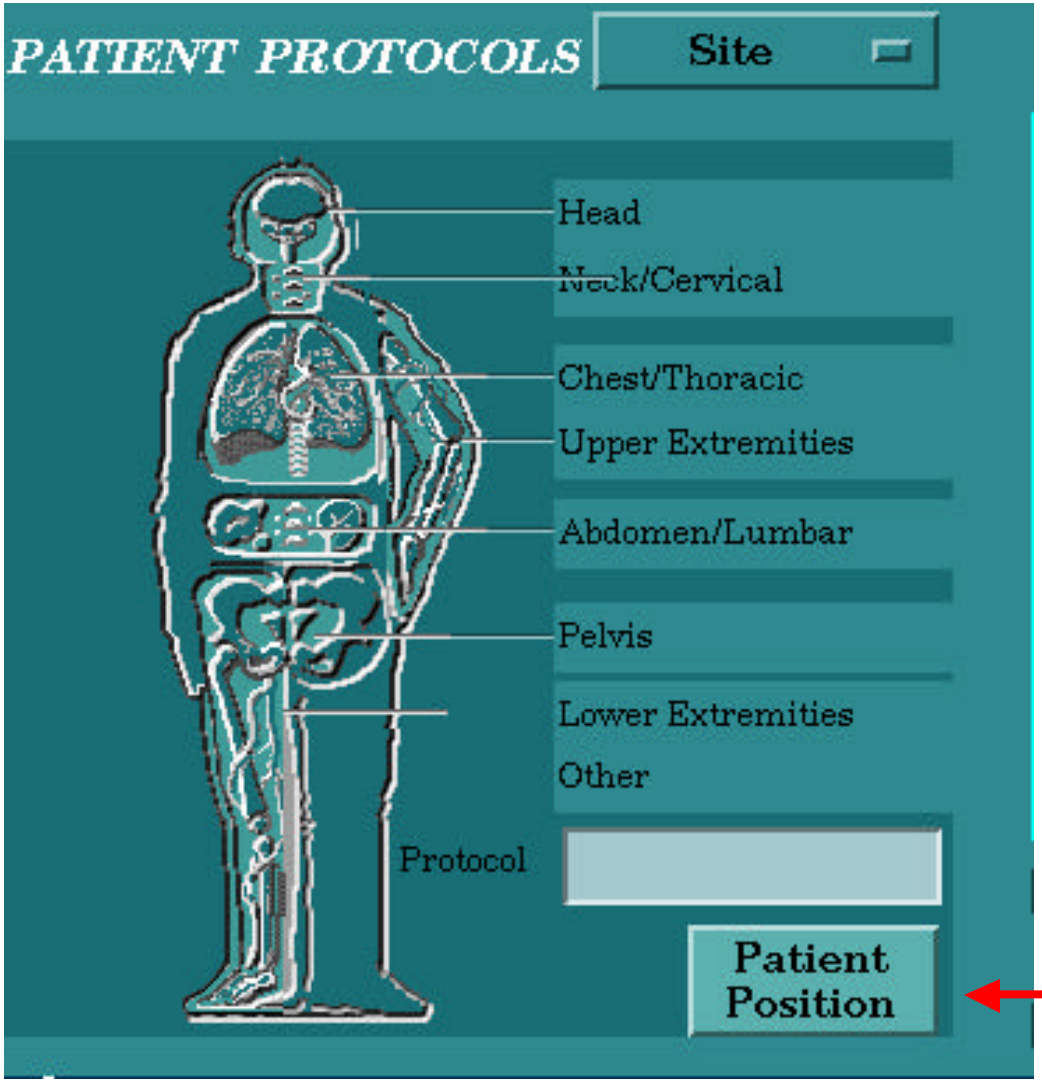
- Date and Time
- Informix space
- Message Board
- Scanner Operations
- Protocol Manager
  - MIS/RIS Connected Patient Information
  - Protocol Build/Edit
- Browser
- Network
- Tools
- Piece of the Puzzle

Protocol Prescription Window



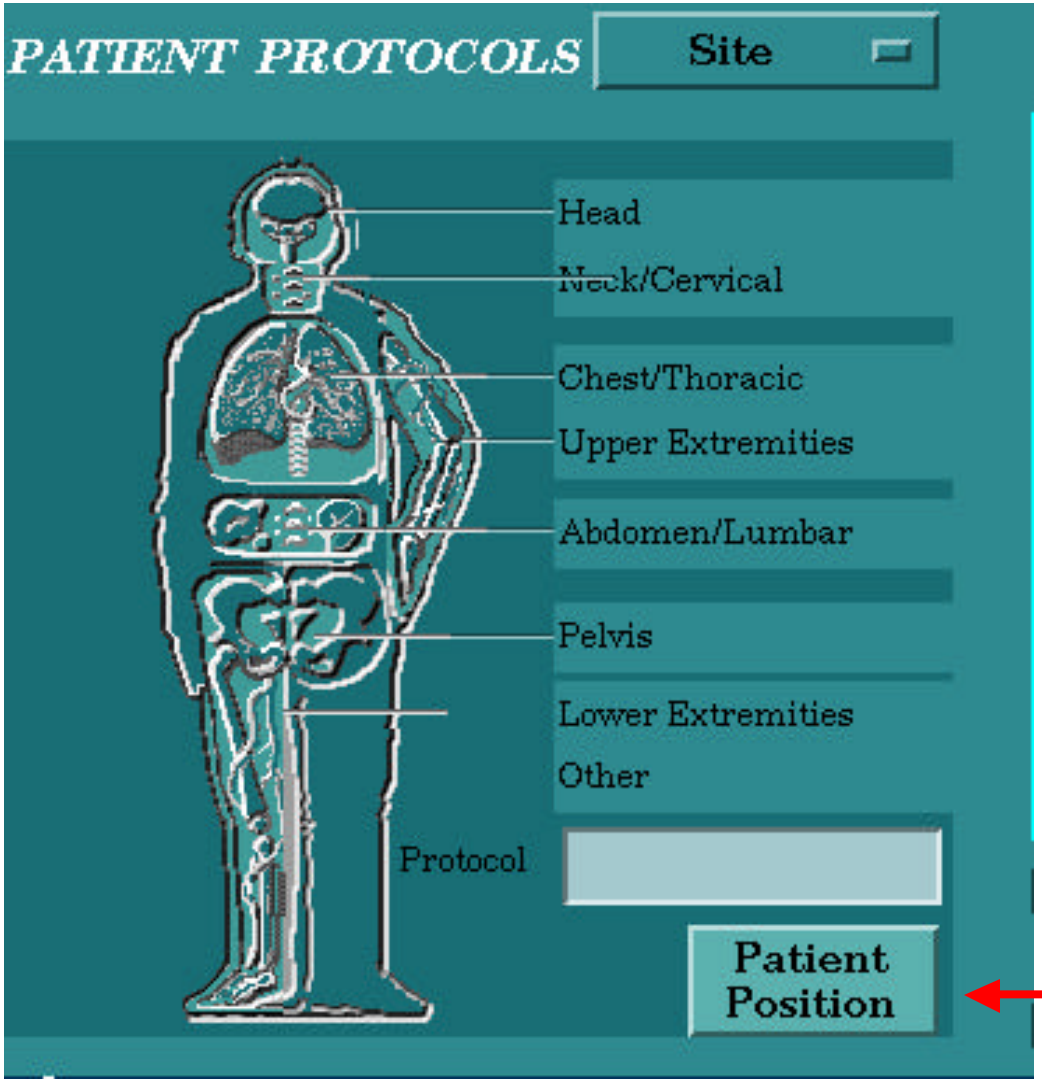
- Patient RX
  - Not applicable to the 3T
    - Mis/Ris Connections
- Protocol RX
  - Protocols can be built and saved or to modify a previously saved protocol

Patient Protocol Window



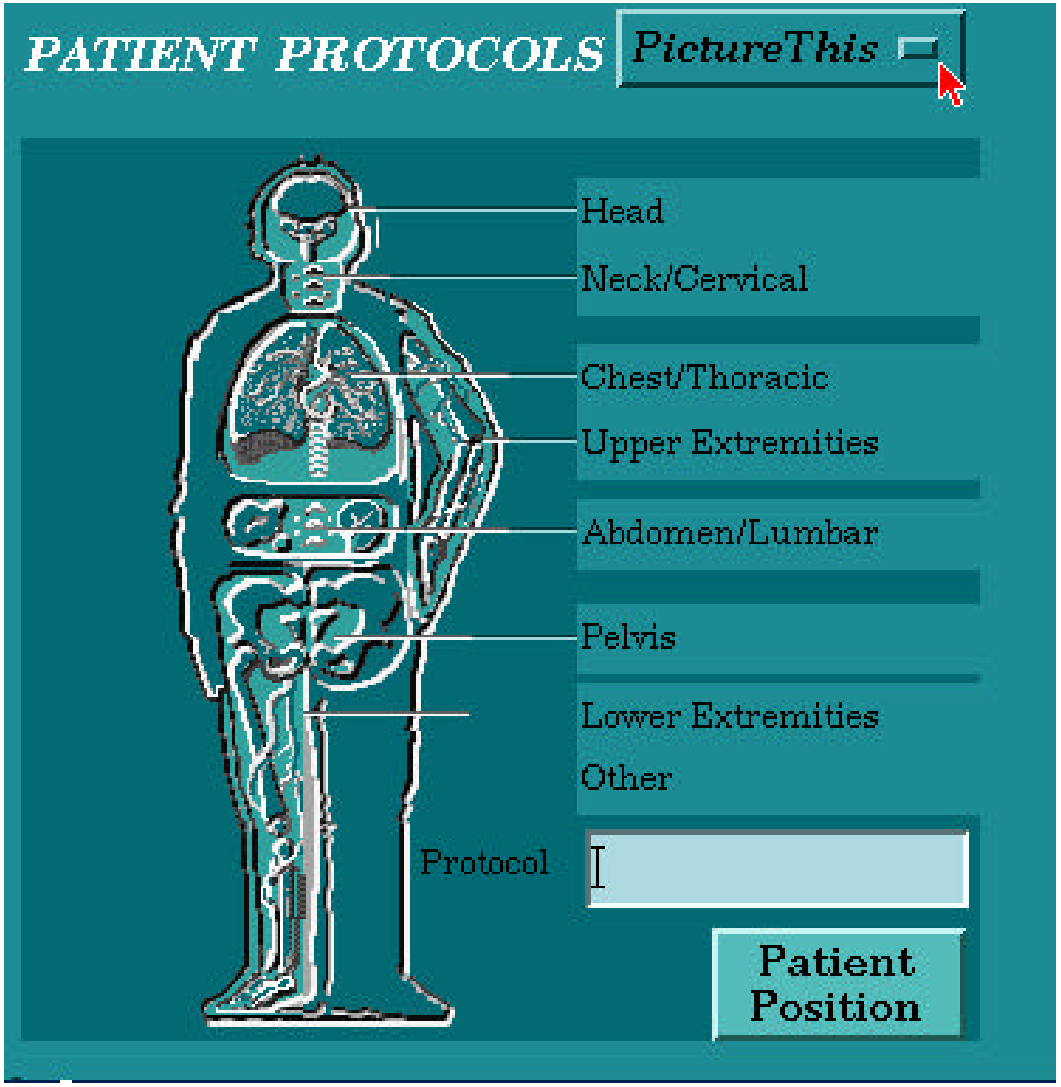
- Use pre-saved protocols from the anatomy "cookbook"
- Build protocols from scratch using the *Patient Position* button

Patient Protocol Window



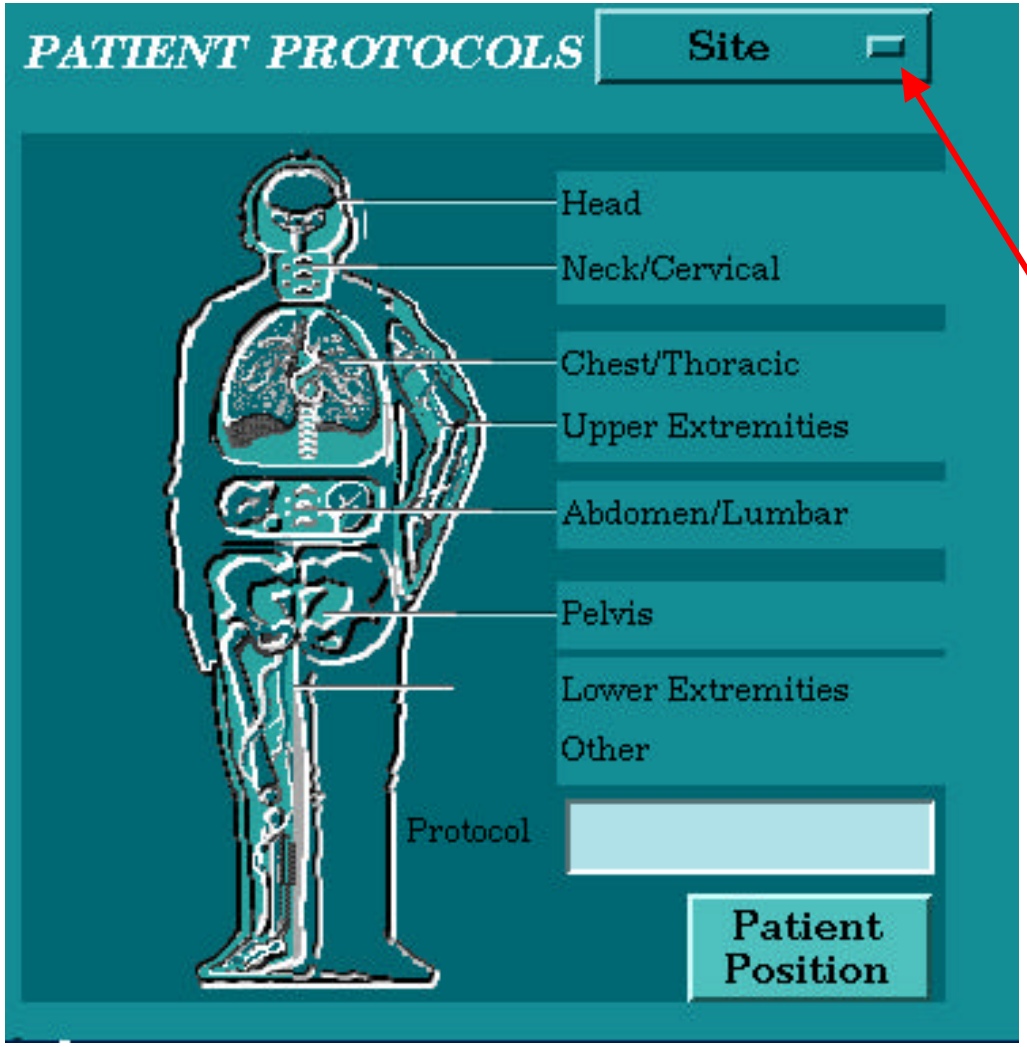
- Use pre-saved protocols from the anatomy "cookbook"
- Build protocols from scratch using the *Patient Position* button

Patient Protocols_*Picture This*



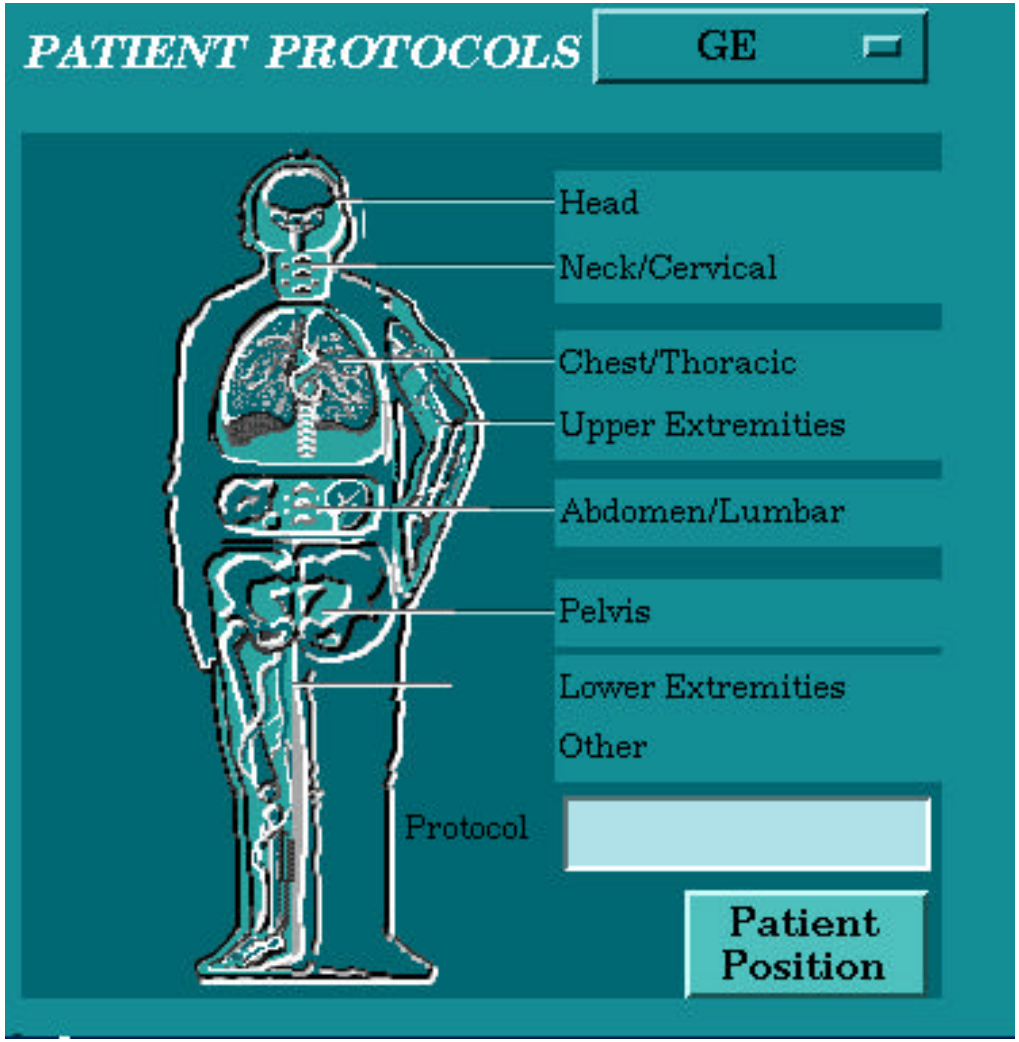
- This is the default setting when the scanner has been shutdown and rebooted (not TPS reset)
- Point to a Body Part for for specific protocol
  - (not the same as pre-saved Site protocols)

Patient Protocols_*Site*



- Specific Protocols that were built and saved "on site"
- Site
  - The saved protocols from "our" 3T Users
    - QA_Daily Phantom
    - MR Venogram
    - Dpine_Adolescent Study
    - etc.

Patient Protocols_*GE*

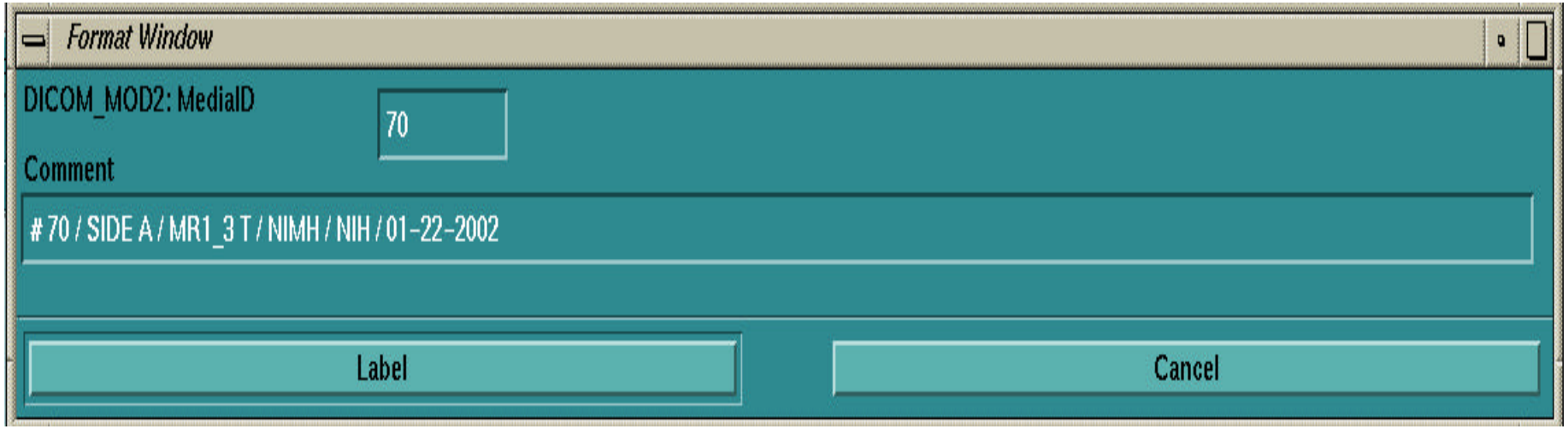


- Protocols GE pre-loaded at factory
  - Gives starting parameters
  - Not optimized for individual scanner
- Listed by body part and type e.g.
  - Head, Vascular
  - Head, MS with Contrast
  - etc.

Specific Icon Functions and Uses

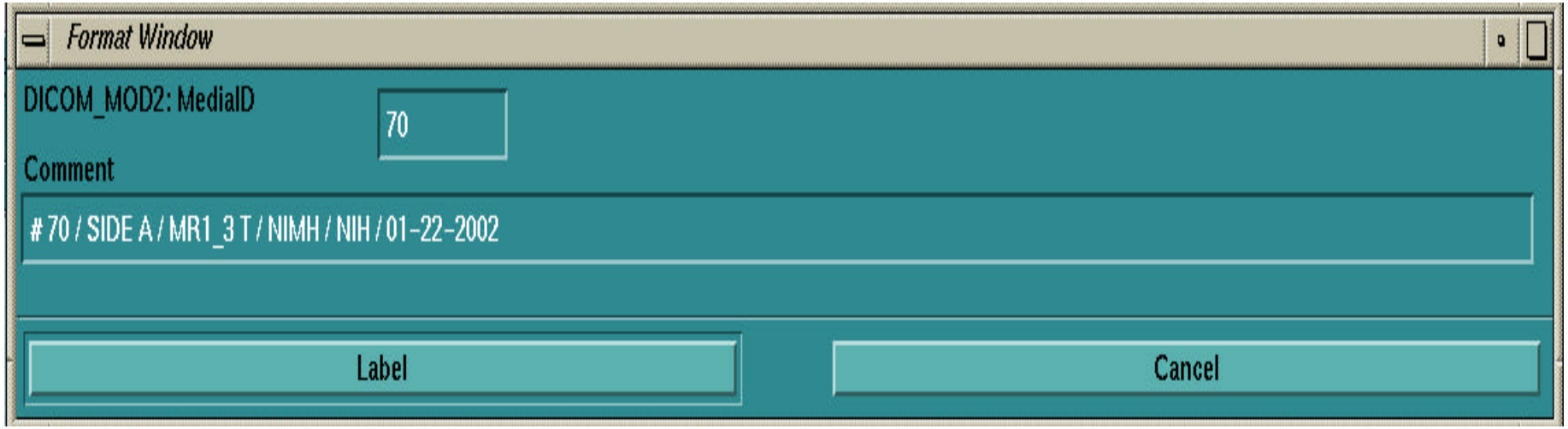
- Date and Time
- Hard Drive Space
- Message Board
- Scanner Operations
- Protocol Manager
- Browser
  - Archive functions
  - Filming functions
  - Network (local) functions
- Network
- Tools
- Piece of the Puzzle

The MOD



- MOD = Magneto Optical Drive
  - Stores information via laser (light) and via the magnetic method
    - magnetically polarized digitized data (0's,1's)
  - Stores Image Data (not raw or epi files)
  - All patient/animal studies must be archived

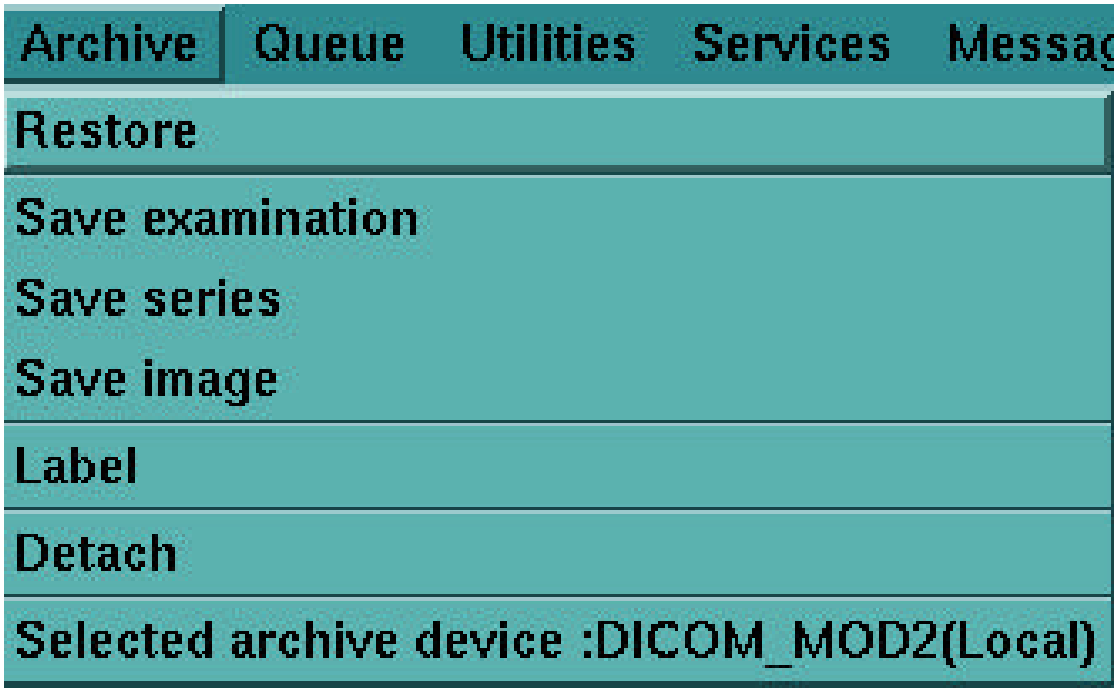
Labelling the MOD



- Click on Browser Icon
  - Click Archive
    - Click Label Disk
      - Enter the information as above
        - » Click Label

        (be sure to not overwrite data on a previously labeled disk!)

Archive / Restore Procedure



- Select Browser Icon
  - Click on Archive
    - Save by Exam
    - Save by Series
    - Save by Image

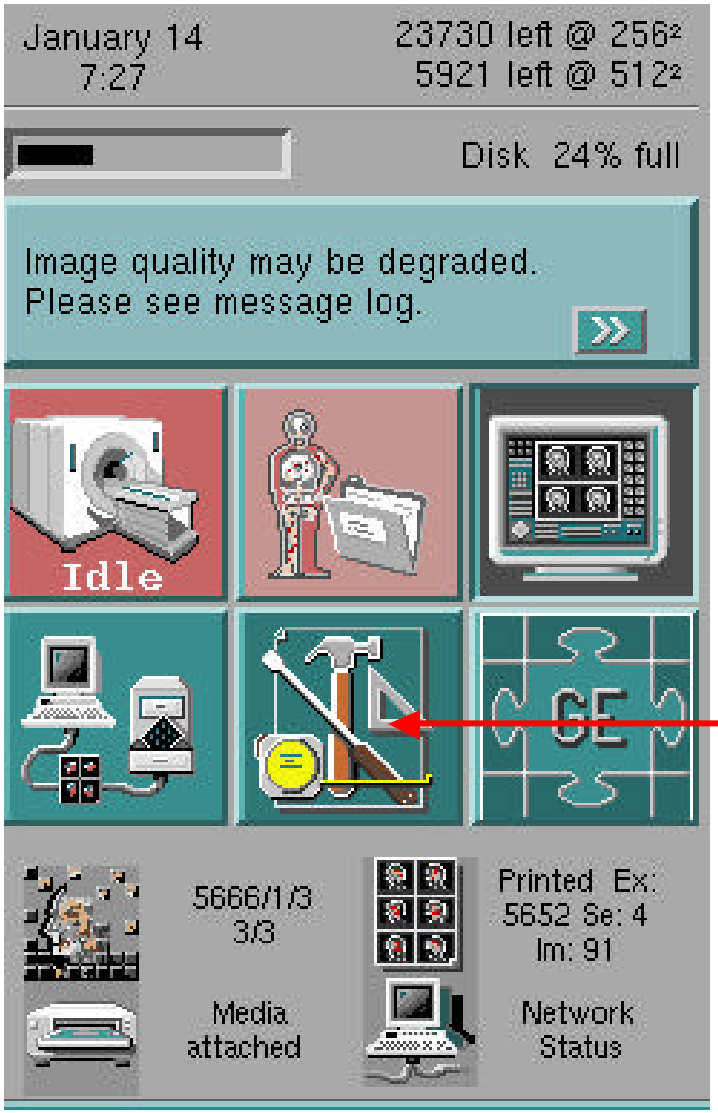
Specific Icon Functions and Uses

- Date and Time
- Informix space
- Message Board
- Scanner Operations
- Protocol Manager
- Browser

- Network
  - Administrative Set-up only
  - No General User Operations

- Tools
- Piece of the Puzzle

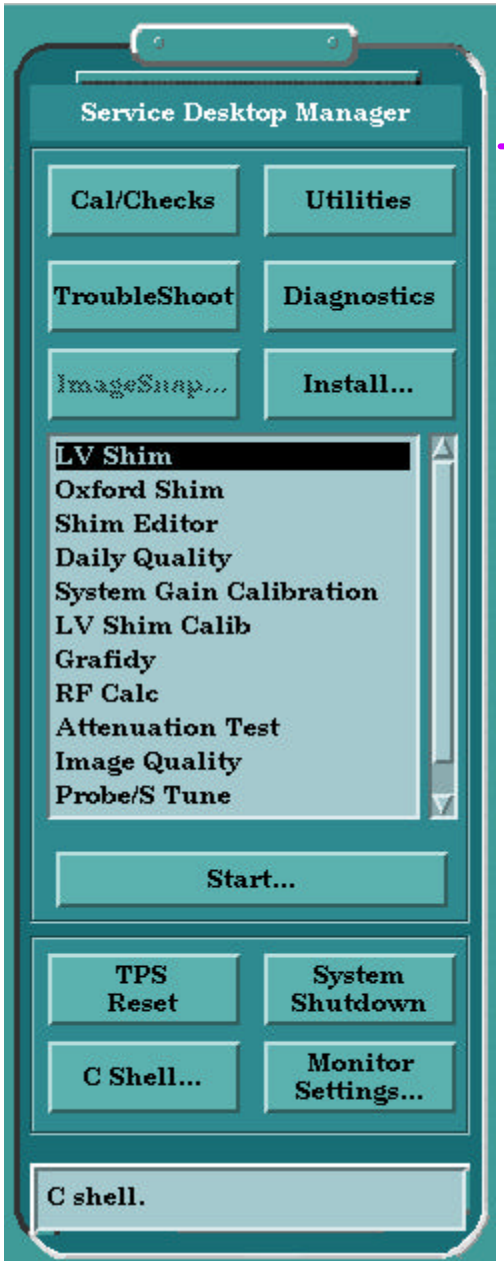
Specific Icon Functions and Uses



- Date and Time
- Informix space
- Message Board
- Scanner Operations
- Protocol Manager
- Browser
- Network

- Tools
  - Engineer Options
  - Reset TPS
  - C Shell
  - System Shutdown

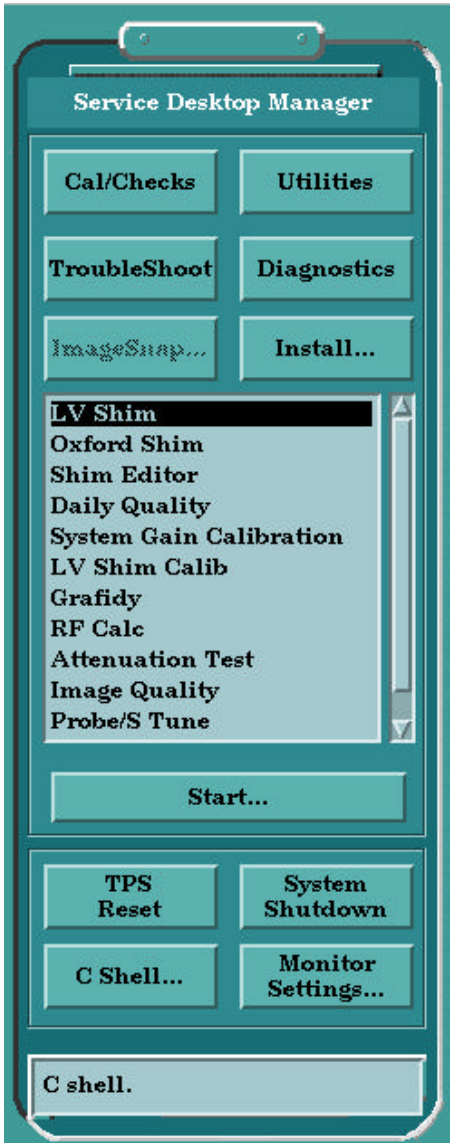
- Piece of the Puzzle



The Tools Icon Window

- Engineer Options
  - Cal/Checks
  - Utilities
  - etc.
- User Options
  - TPS Reset
  - System Shutdown
  - C Shell

The Tools Icon_TPS Reset



TPS = Transceiver Power Supply

How it works:

The experiment is running …

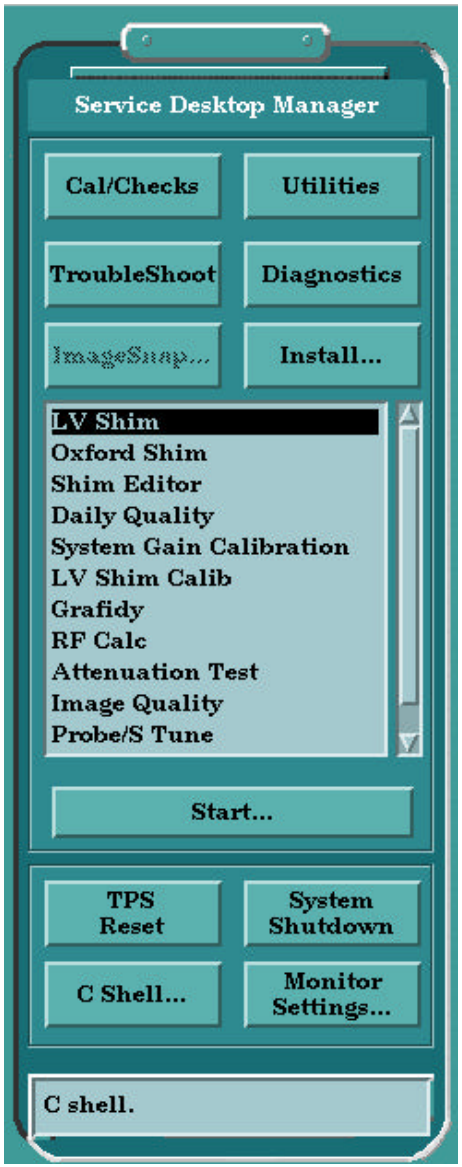
The NMR signal goes to the pre-amplifier(receiver aspect) and then it goes to the UCERD, where it is digitized.

Click on TPS Reset

- TPS Reset Yes or No?
- TPS Reset in process

  - When process is finished and continuing on same patient
  - At the Patient Number type MR
  - (most recent)
    - Do not have to re-landmark!

TPS Reset + UCERD



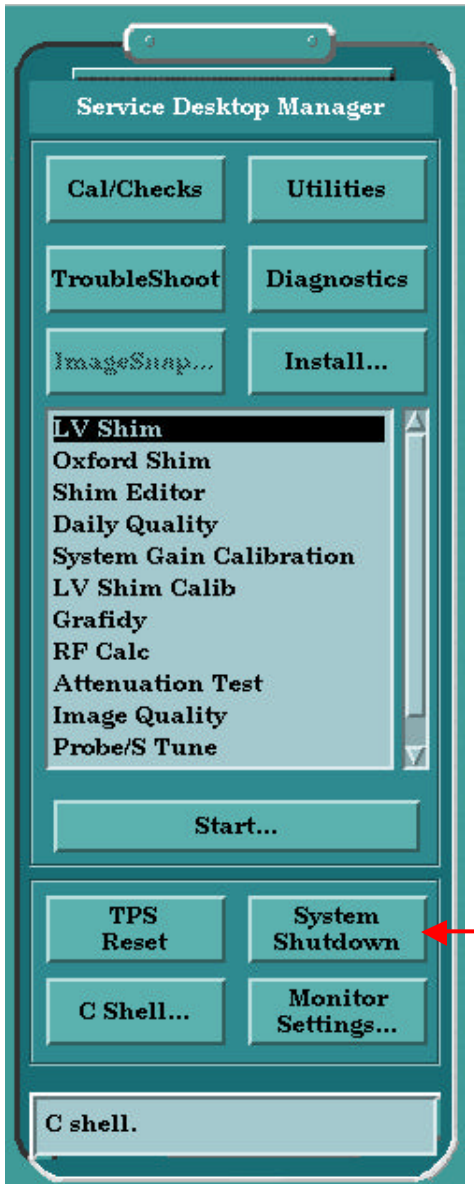
TPS = Transceiver processing and Storage

The TPS encompasses the Array Processor + the digital aspect of receiver, etc.

- UCERD = Universal Combined Excited Receiver Digital
  - Digital Receiver board
  - Analog receiver board
  - Exciter transmit board
- Allows the same piece of hardware to be interchangeable amongst field strengths (1.5 T, 3 T, 7 T etc).

- Sometimes it is necessary to recycle power to the TPS / Systems Cabinet:
  - See Jerzy, Sean, Karen or Paula for help

The Tools Icon Window_System Shutdown



- Engineer Options
- User Options
  - TPS Reset
  - C Shell

System Shutdown

  - Click on System Shutdown
    - System Shutdown

      Yes or No?

Specific Icon Functions and Uses

- Date and Time
- Hard Drive Space
- Message Board
- Scanner Operations
- Protocol Manager
- Browser
- Network
- Tools
- Piece of the Puzzle
  - GE's Puzzle
  - No Operations Available (yet)

Scanning and Shimming

The Start-Up Procedure for 3T_1

- Signa Shutdown
  - Do NOT Shutdown Signa (and leave down) at night!!
- Signa Reboot

- Sun ADW shutdown to root
- Sun ADW Reboot

- Potassium shutdown to Red Hat Login Prompt
- Connect to sdc-adw

The Start-Up Procedure for 3T_1

- Shut- down the scanner
  - Tools Icon
    - System Shutdown?
      - Yes
- Reboot the scanner
  - Signa Icon
  - xxxxxx
- Bring down the SUN ADW to Root
  - At (#) prompt, type reboot
    - Root
    - xxxxxxxx
- Bring Down Potassium to Login Prompt
  - Login at prompt:
    - sdc-adw
    - sdc-nfs

Signa DOWN Procedure

- Shut- down the scanner

  Tools Icon

  System Shutdown?

  Yes

  Wait until scanner is down

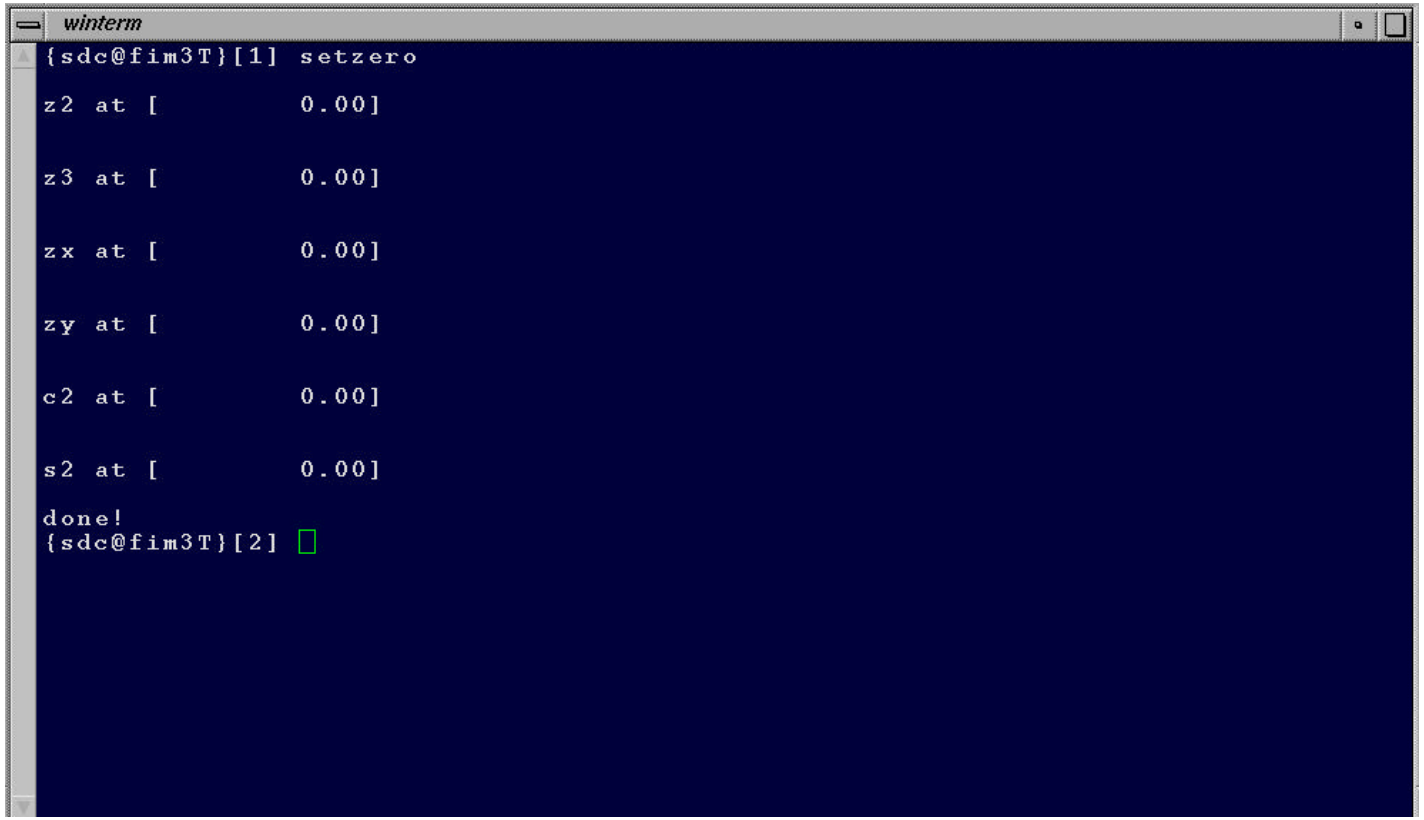
Do NOT Shutdown Signa (and leave down) at night!!

Signa UP Procedure

- Reboot the scanner
  - Signa Icon
  - xxxxxx
- Reboot SUN ADW
- Reboot Potassium

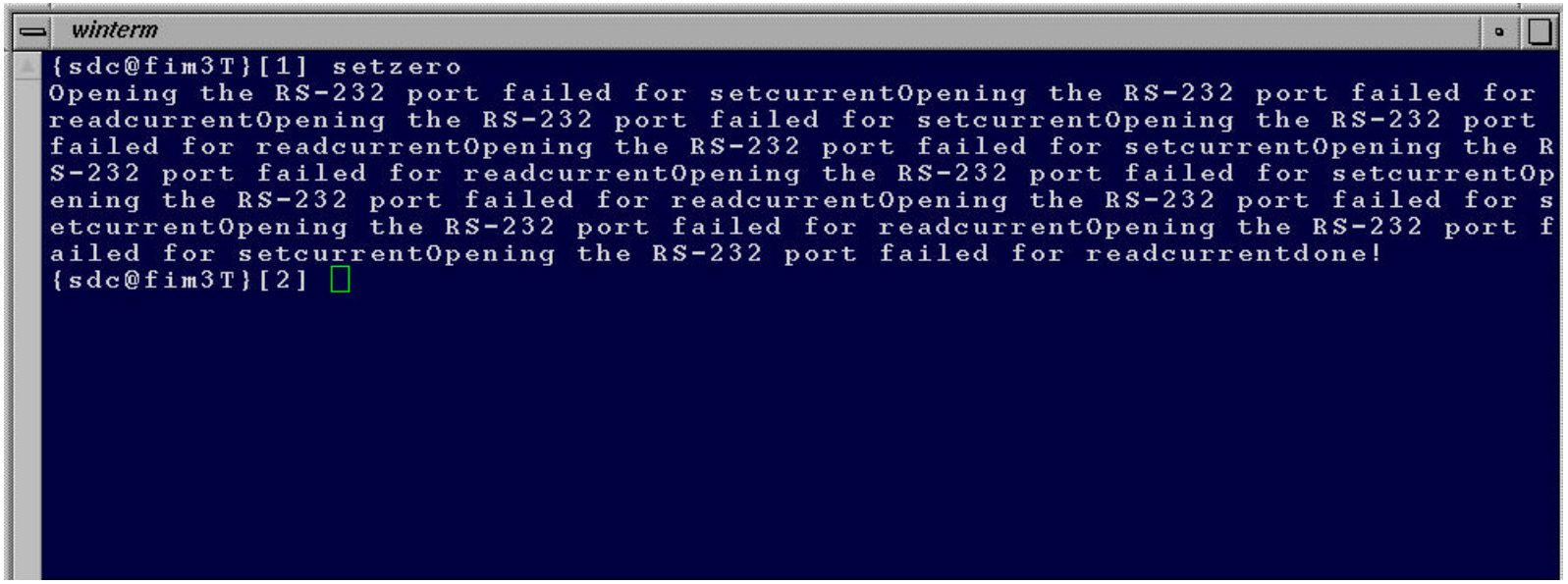
Do NOT Shutdown Signa and/or the Sun ADW (and leave down) at night!!

Set Zero in C Shell



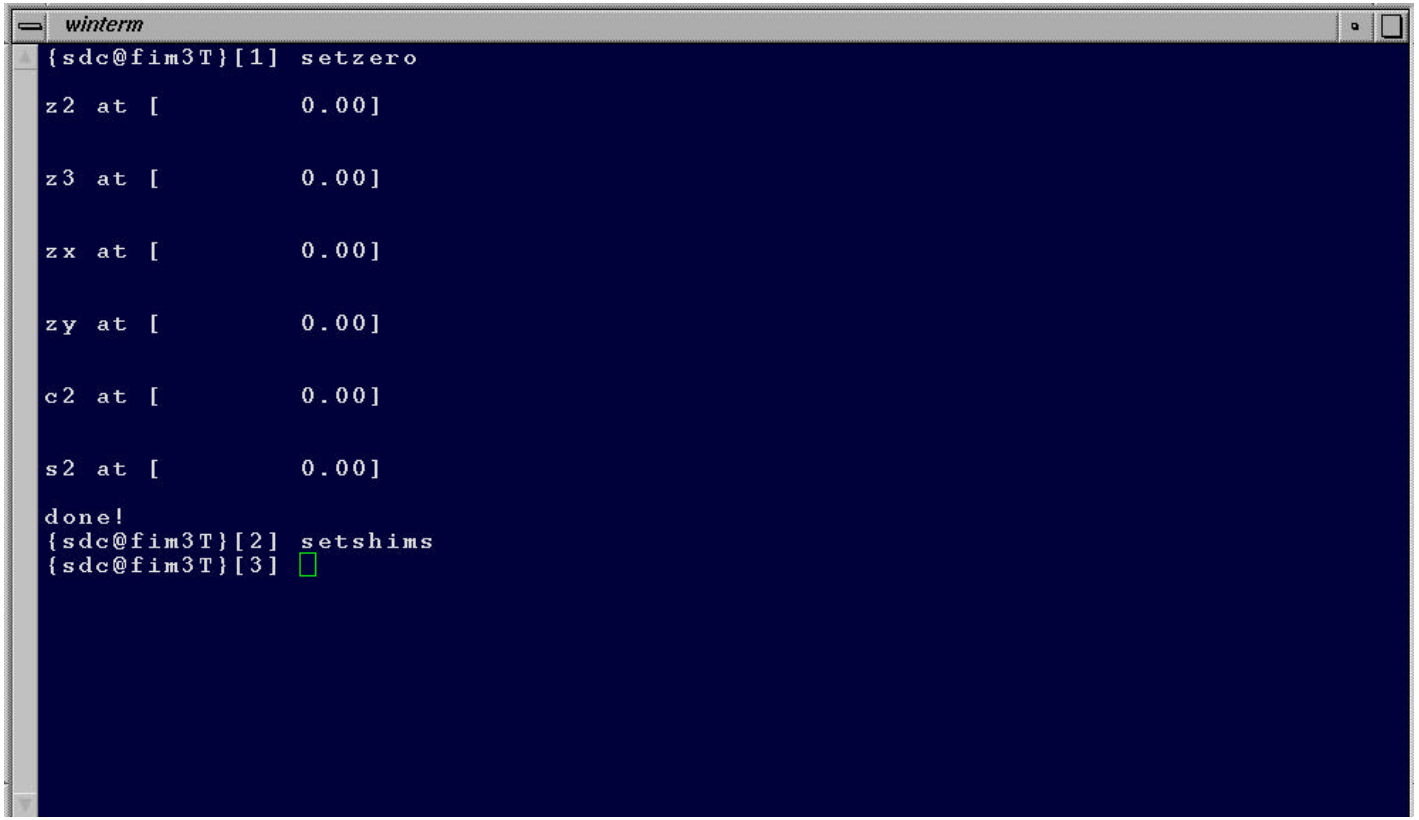
- Tools Icon
  - Type setzero
    - Enter

Failed Connection for Shims



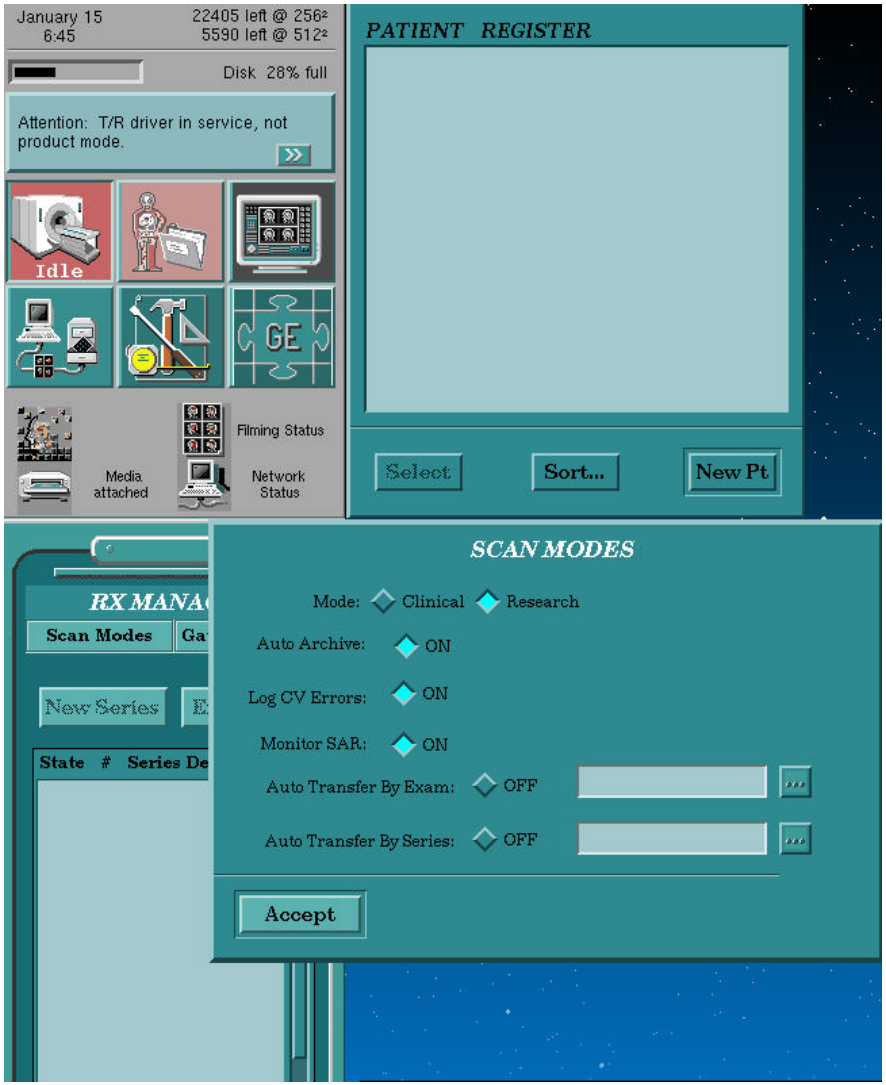
- Tools Icon
  - Open a C Shell
    - Type setzero
- Failed Connection
  - Bring scanner down and then reboot until you get a good connection

Set Shims in C Shell



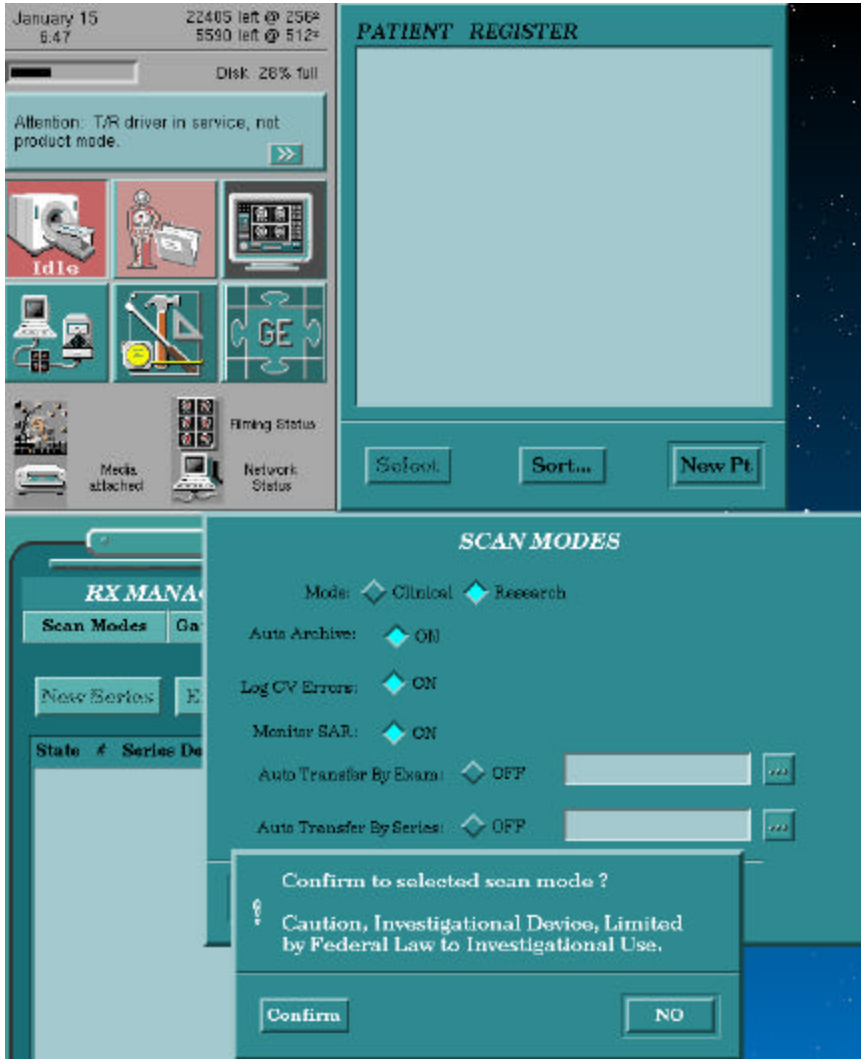
- At prompt, type setshims
  - Only if preceded by a successful setzero command

The Scan Modes Window



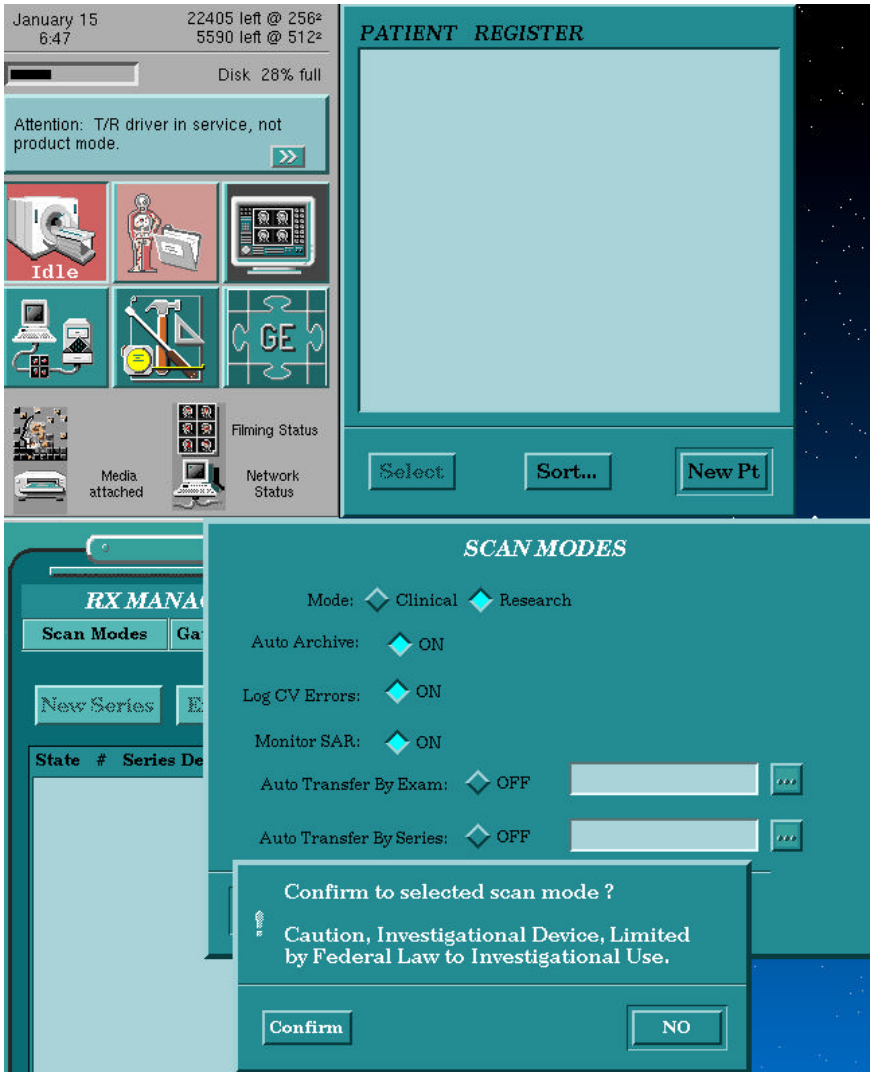
- Click on Scan Modes
- Click on Research
  - Click Confirm at prompt
- Click on Auto Archive (for OD)
- Click on Log CV Error
- Click on Monitor SAR (Always!)

Selection of Scan Modes During Morning Start-Up



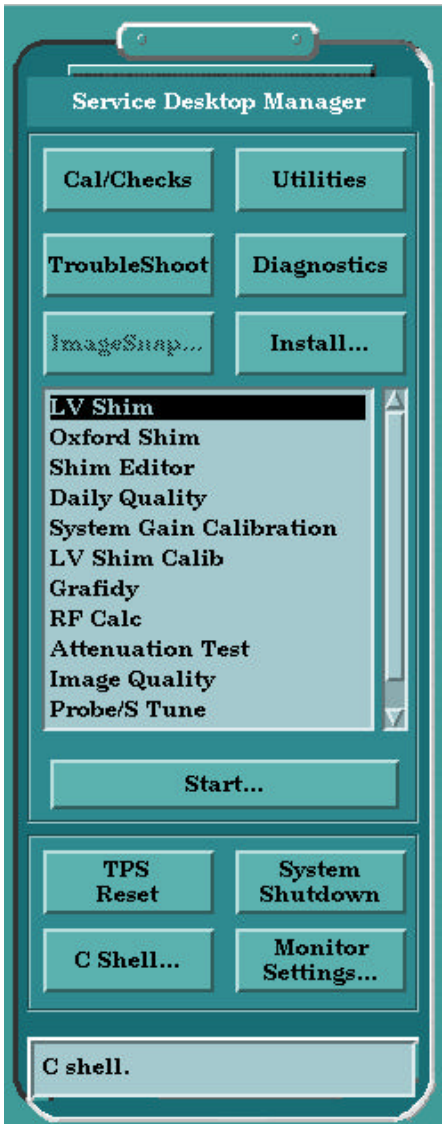
- Research mode must be selected
- Auto Archive relates to the MOD
- Log CV errors for review
- Always monitor SAR

The Scan Modes Window_ Research Prompt



- Must Use Research Scan Mode except for the standard Clinical Scans (non-MP_Rage)

The Tools Icon Window

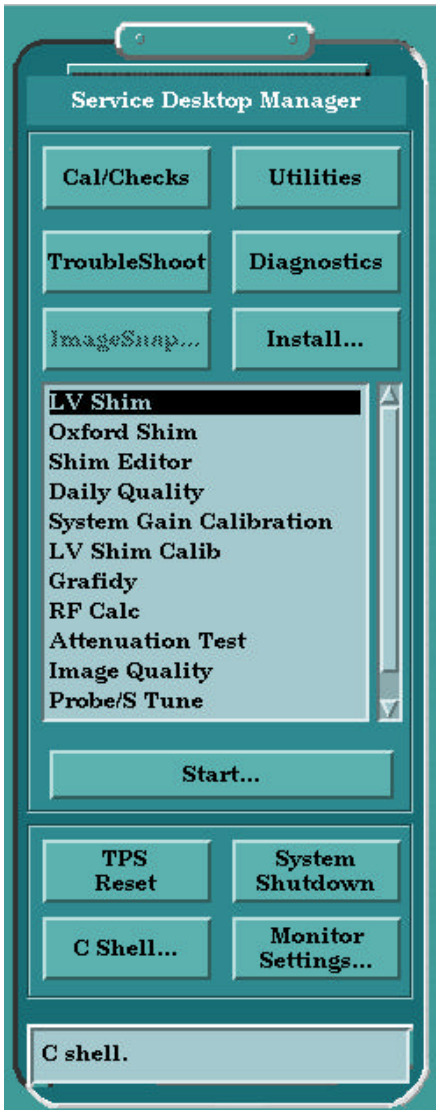


- TPS Reset
  - Click on TPS Reset
    - TPS Reset

      Yes or No?
- System Shutdown
  - Click on System Shutdown
    - System Shutdown

      Yes or No?
- C Shell
  - Set Zero
  - Set Shims
  - ShimCalc

TPS Reset



- Have scan locations written down
- Have Shim parameters written down
- TPS Reset
  - Click on TPS Reset
    - TPS Reset

      Yes or No?
- Type MR at Patient ID
- Go Directly to Protocol #
- Scan
  - Do not have to re-landmark
  - Do not have to re-localize (EPI)

Pre Scan Options

- Auto Pre Scan
- Manual Pre Scan
- Auto Shim
- Manual Shim
- High Order Shim

Center Frequency

- *Center Frequency:*

  – The CF controls the position of the RF transmitter. This can be complicated by the fact that protons occur in two different chemical properties, water and fat. The protons in water and fat have two different resonance frequencies. Water resonates at about - 220 Hz higher than fat, at 1.5 Tesla / - 440 Hz at 3 Tesla.

    - MCV > off_rfcssat = - 440
    - opsat = 1
    - fatsat = 1

Prescan

- The Prescan allows for the adjustment of the transmit and receive gains and for the setting of the center frequency for a specific body part to be imaged.

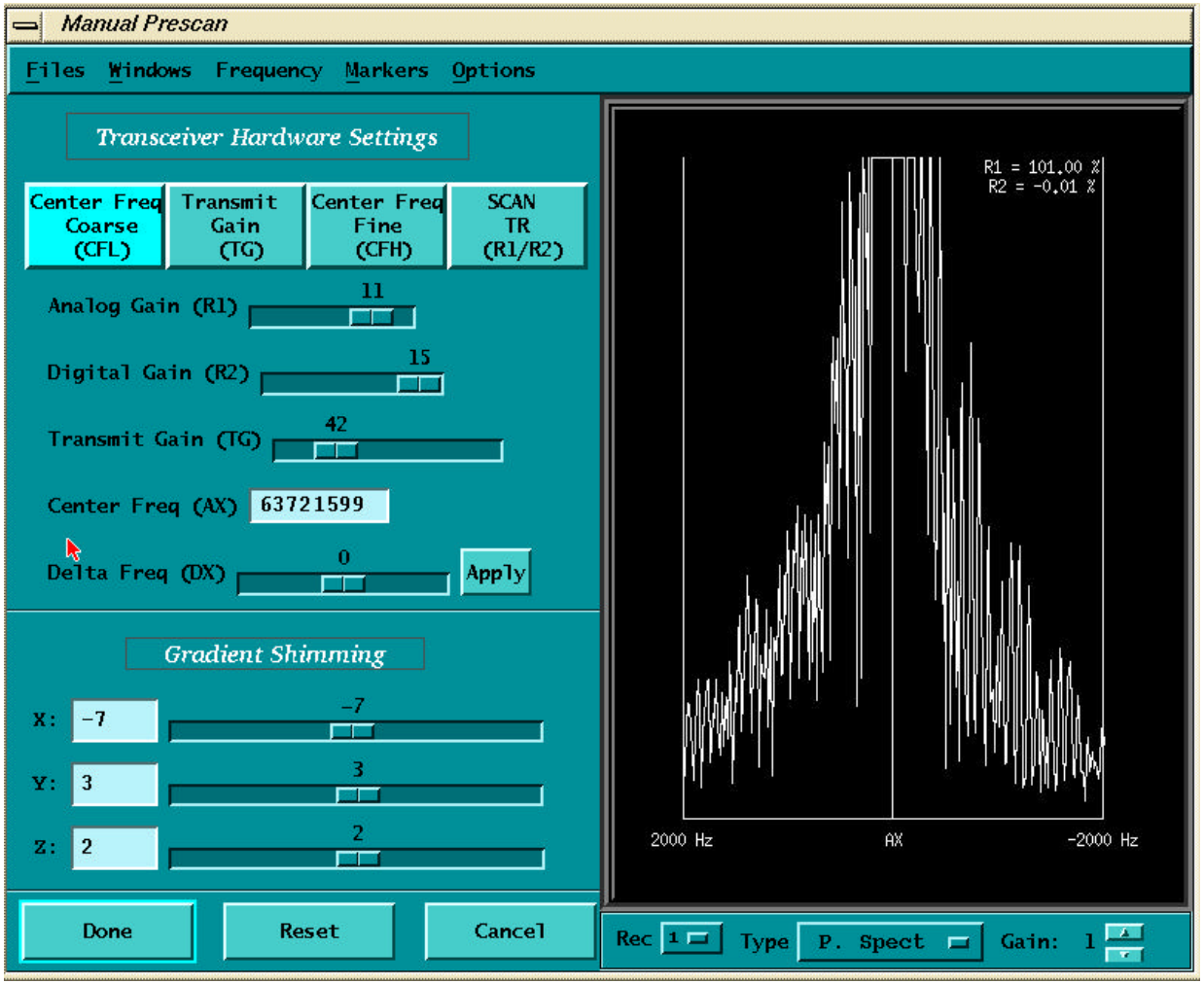
- *Receive Gain:*
  - The RG is measured in tenths of decibels (dB). Receiver set to optimal dynamic range If this is set too high, it will result in over-range with artifacts. If it is set too low, signal to noise might suffer.

Transmit Gain

- The TG determines the RF power emitted by the transmitter and thus the pulse flip angle. The TG is expressed in tenths of decibels (dB).

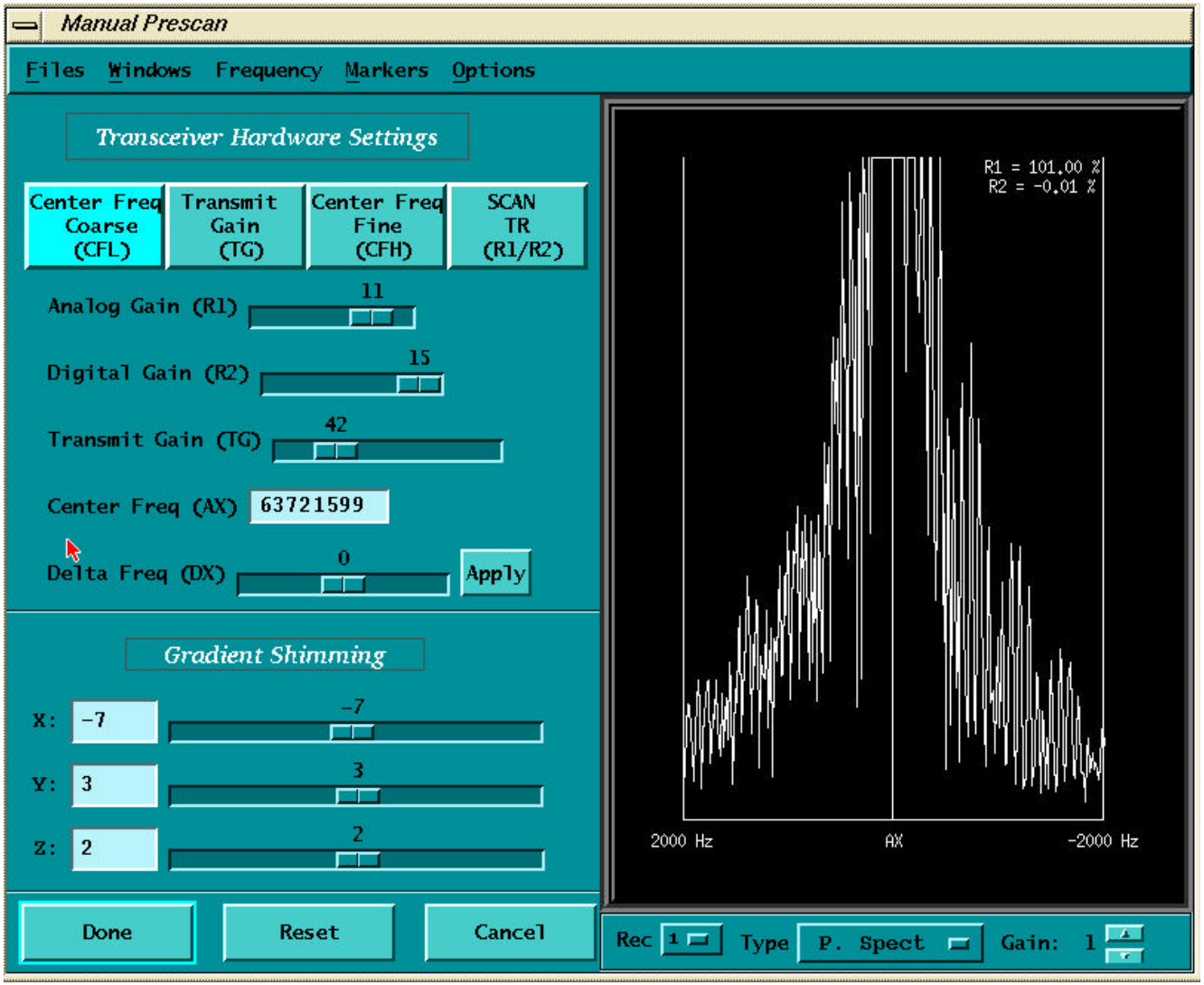
- Power absorption is patient size dependent. The flip angle is proportional to the square root of the transmit power.

Pre Scan



- Center Frequency
- R1
- R2
- Transmit Gain (TG)
- Shim Values

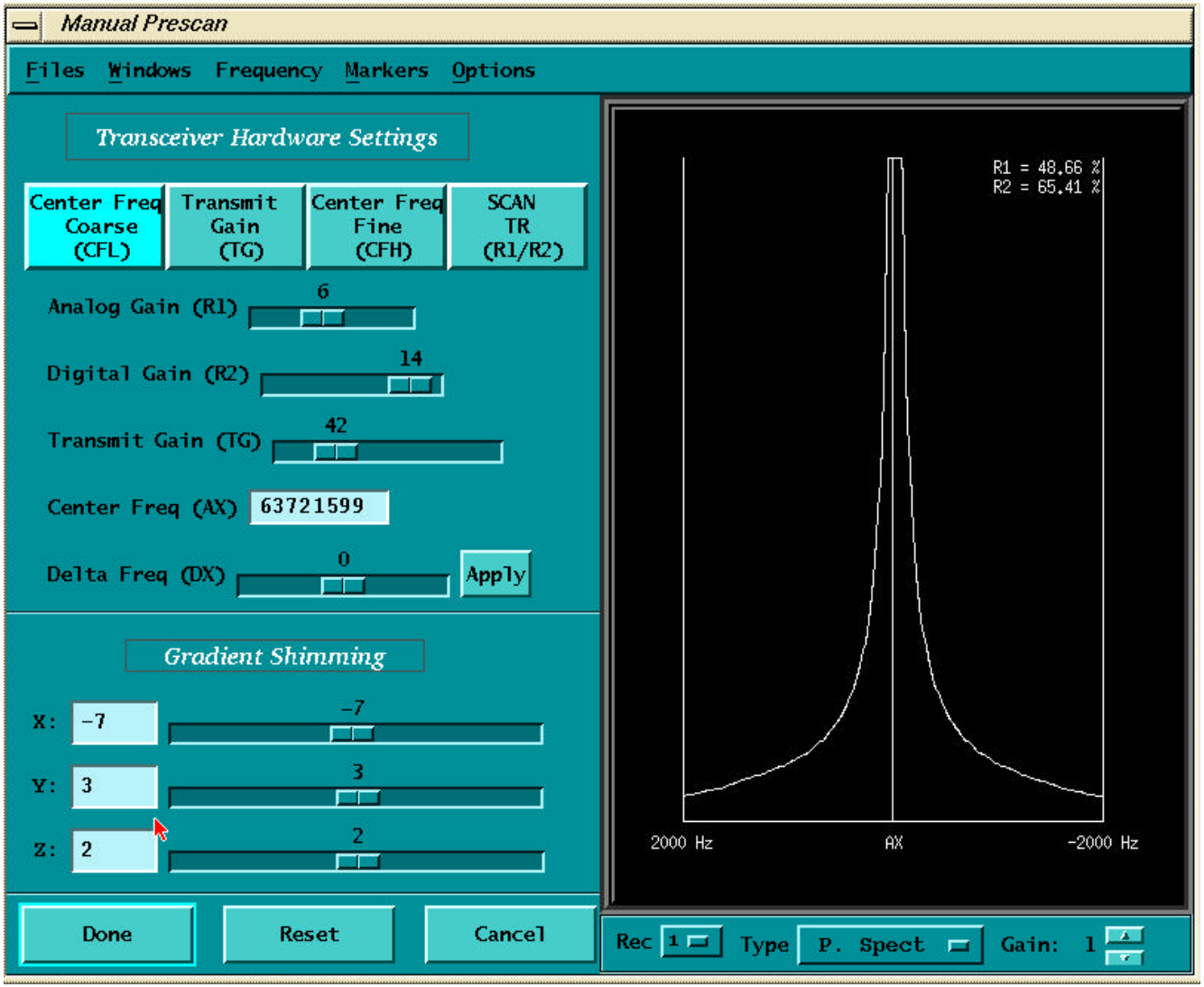
Pre-Scan Over-Range



- R1 > 100%
- R2 > 100 %

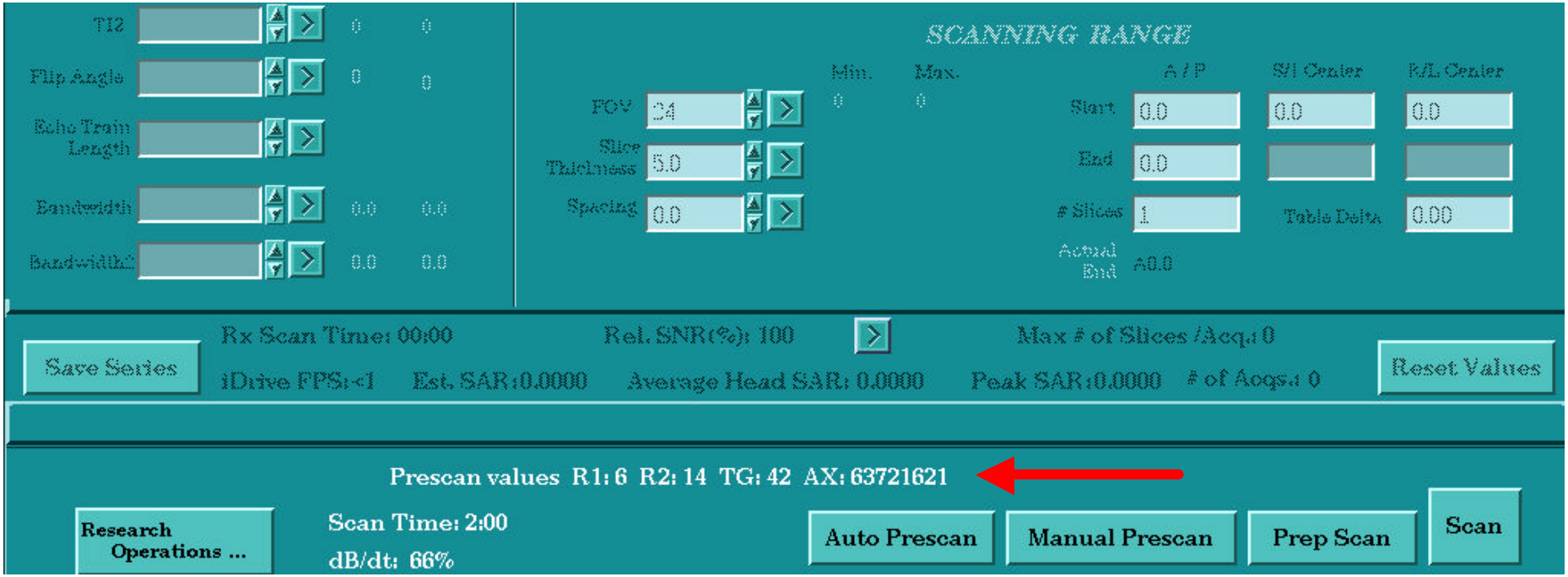
* resultant image could demonstrate artifacts and distortions *

Proper Prescan Values



- Proper values are dependent on:
  - Magnet strength
  - Patient size
  - Pulse Sequence

Pre Scan Values on Operations Page



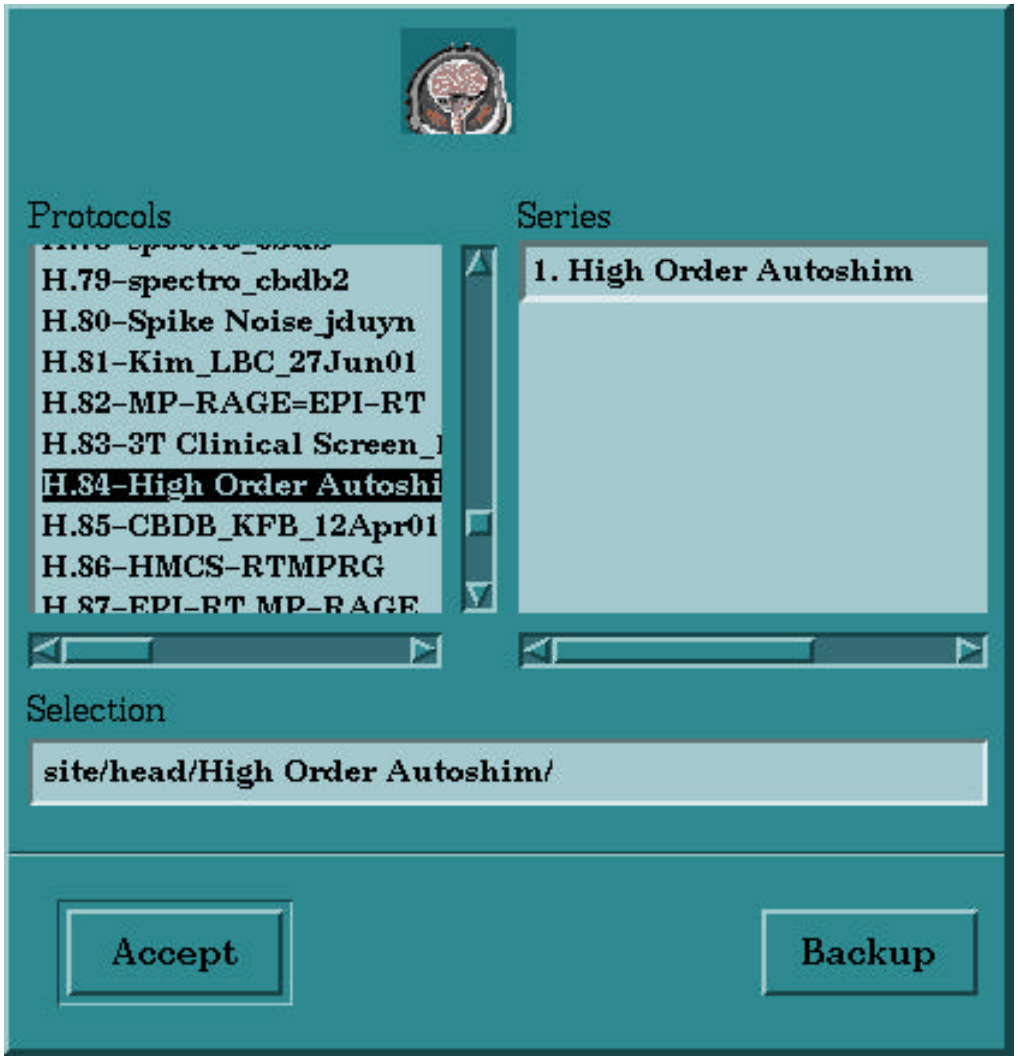
- It’s a good idea to write down the Prescan values for multiple series…especially EPI

Shimming…Why??

- To obtain good homogeneity of the field

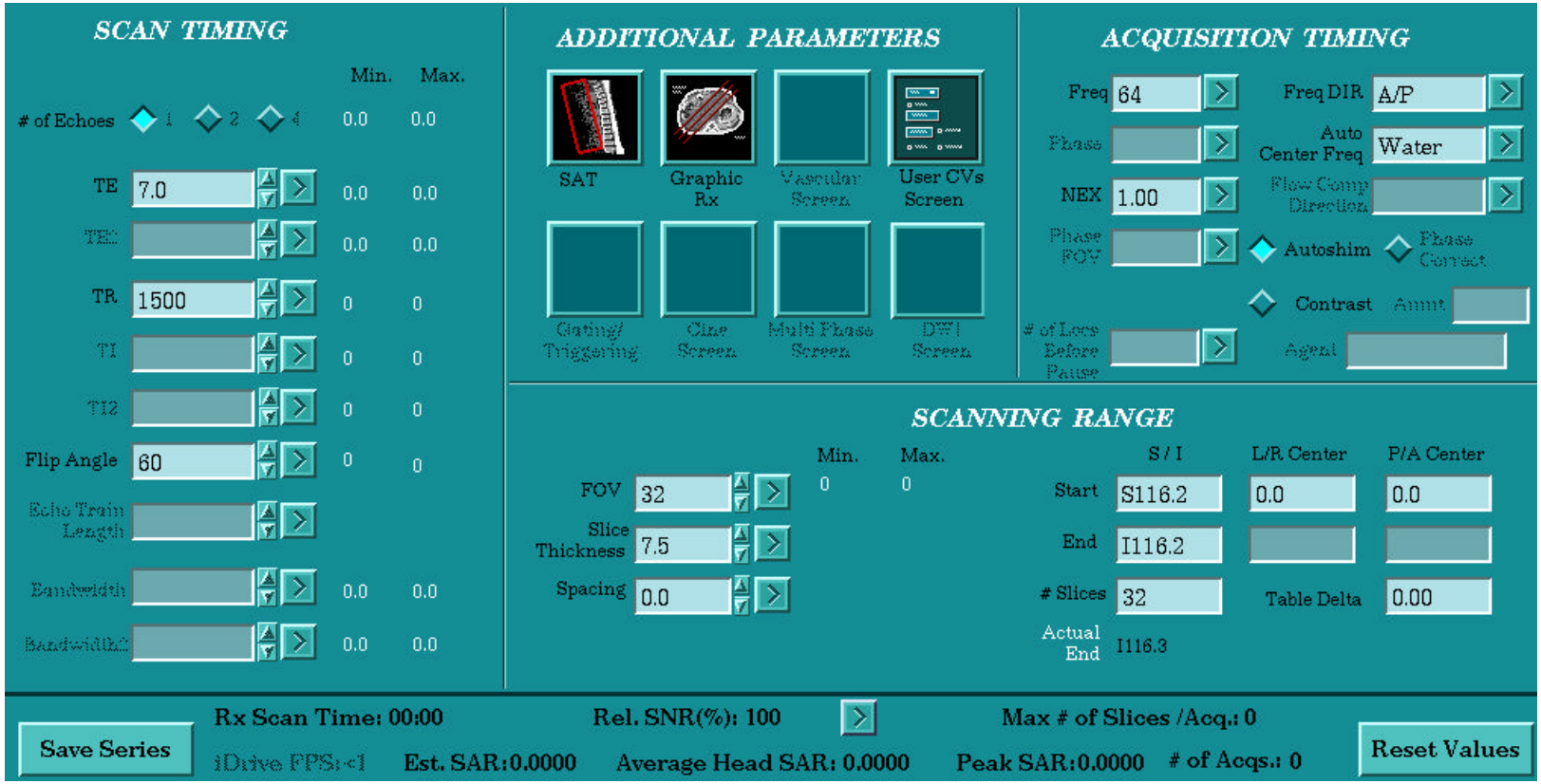
- Fine tuning of the coil to the magnet to the body part at isocenter

High Order AutoShim_Step One



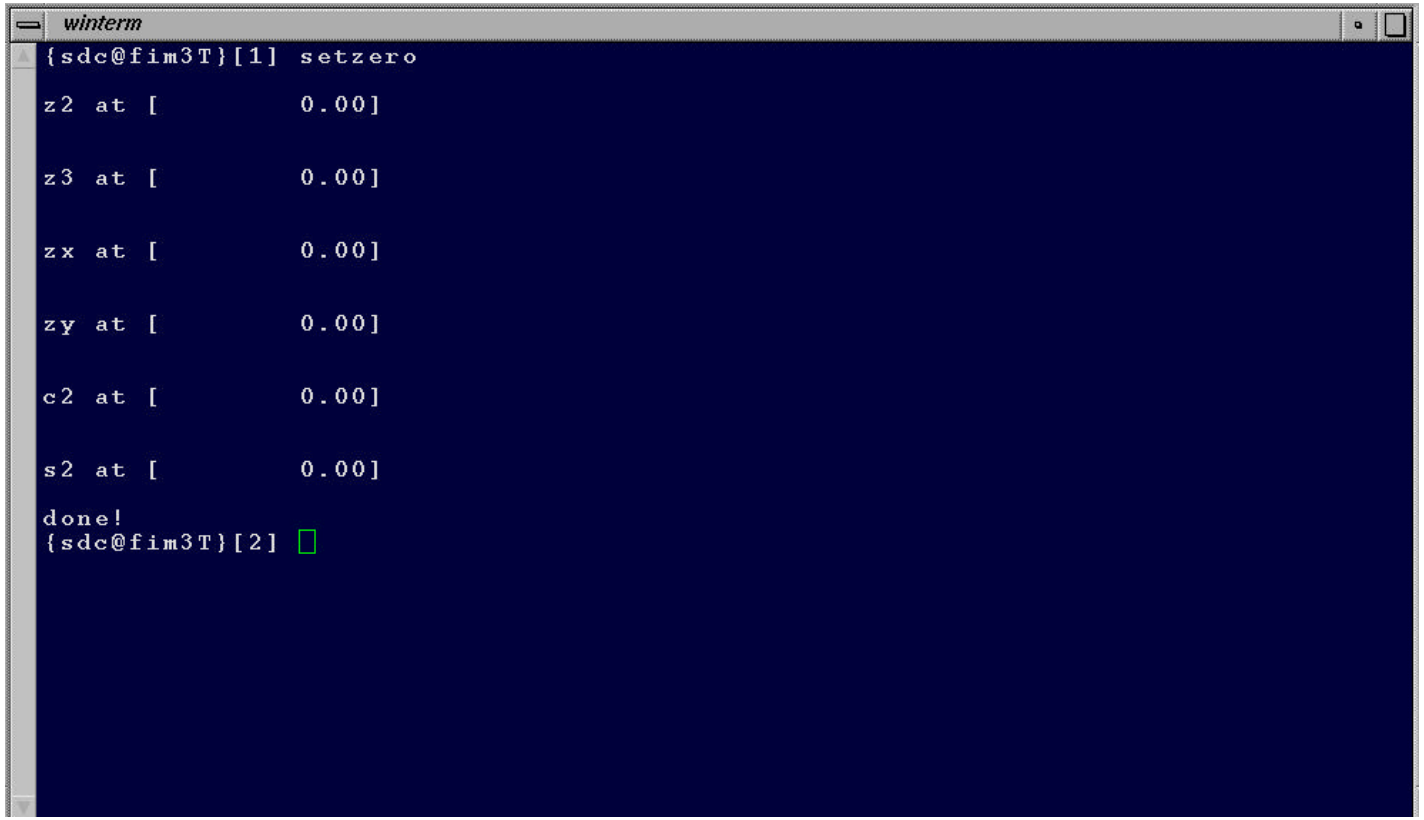
- Click on a Pre-made Protocol that contains the High Order Shim Parameters

Parameters for the High Order AutoShim



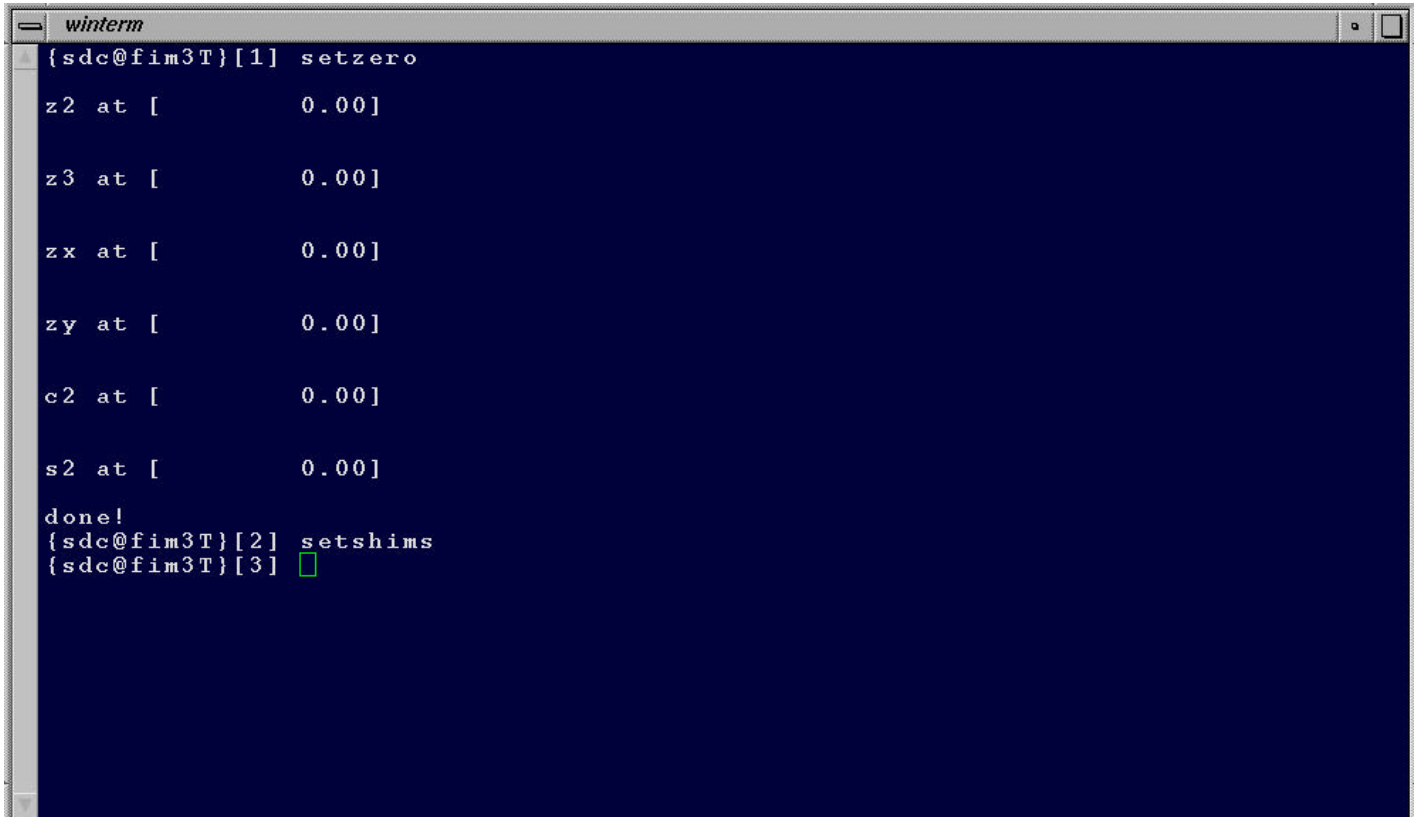
- Change only the Start and End Locations
  - To match the EPI scan locations
- Save, Download and click Scan
  - (no need to Auto Pre-scan)

Set Zero in C Shell



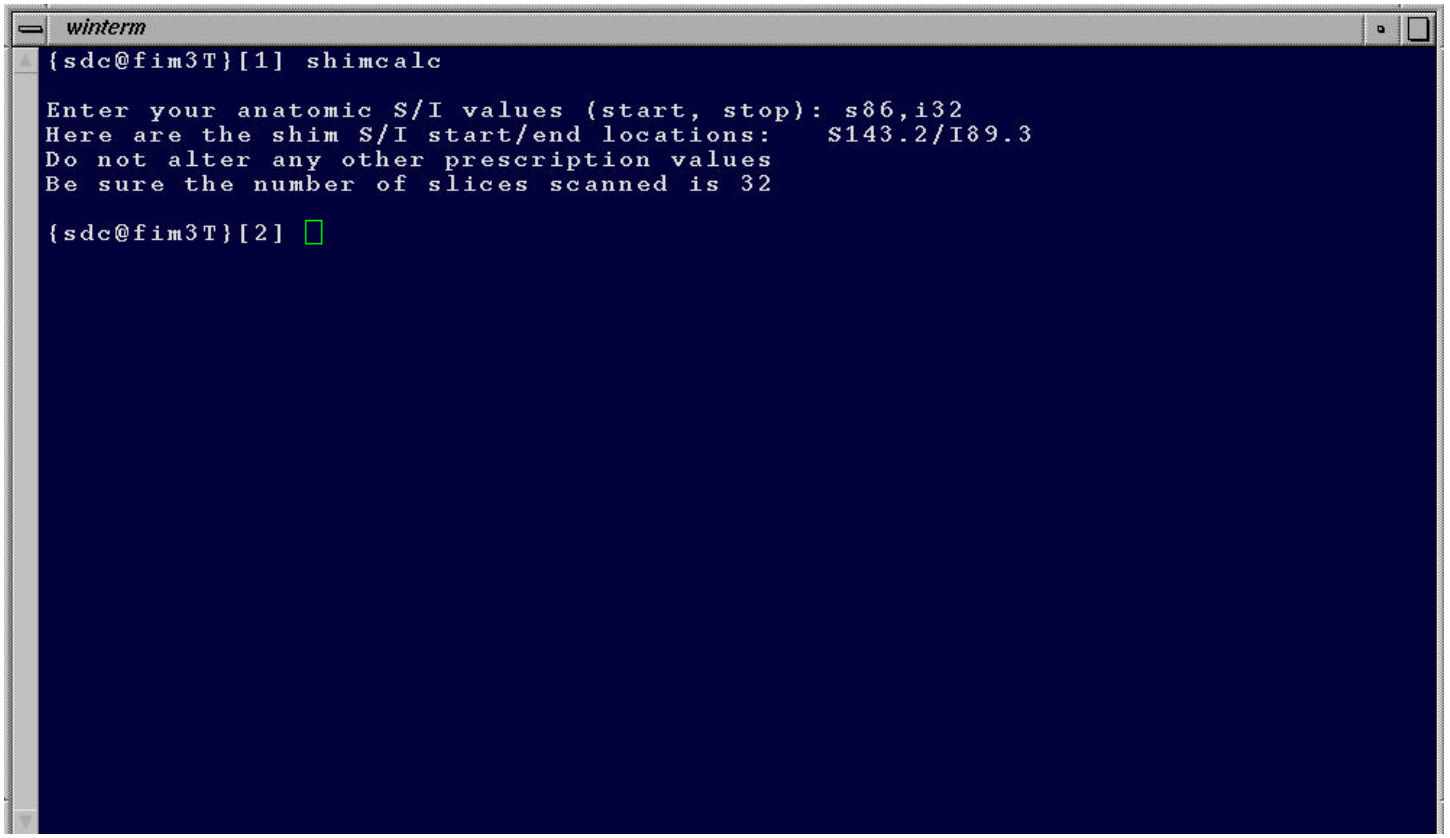
- Tools Icon
  - Type setzero
    - Enter

Set Shims in C Shell



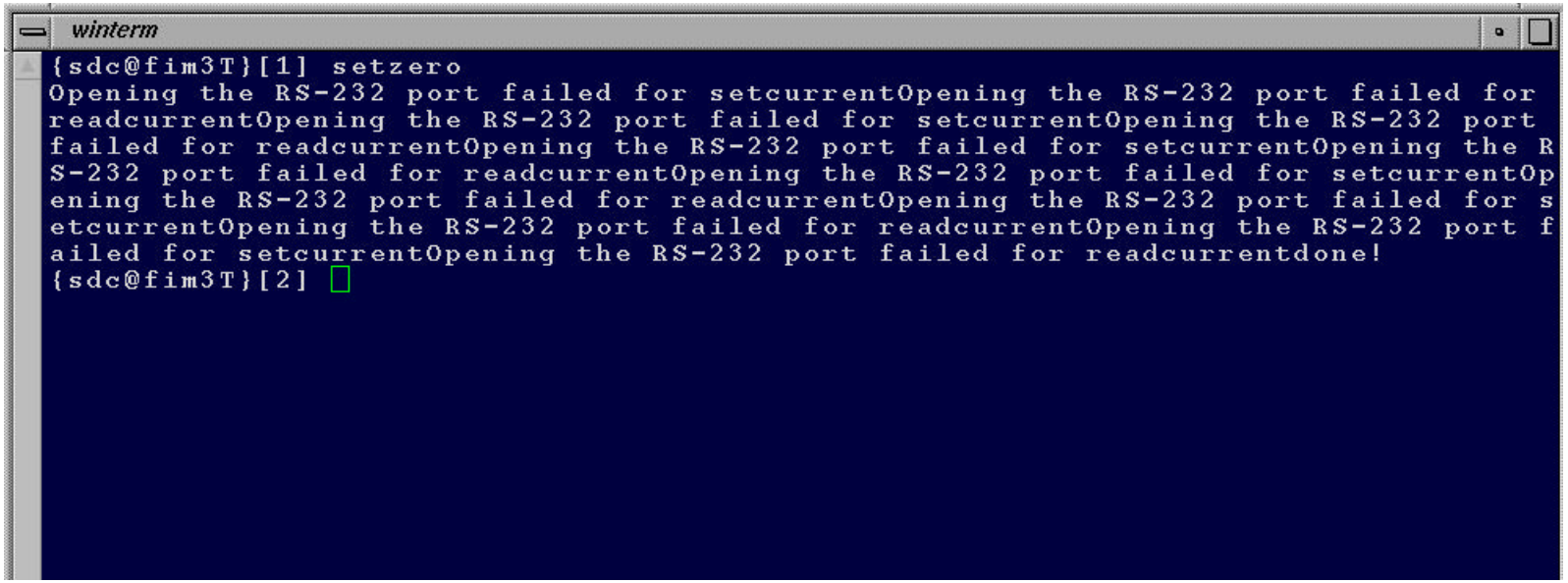
- At prompt, type setshims
  - Only if preceded by a successful setzero command

The ShimCalc Option



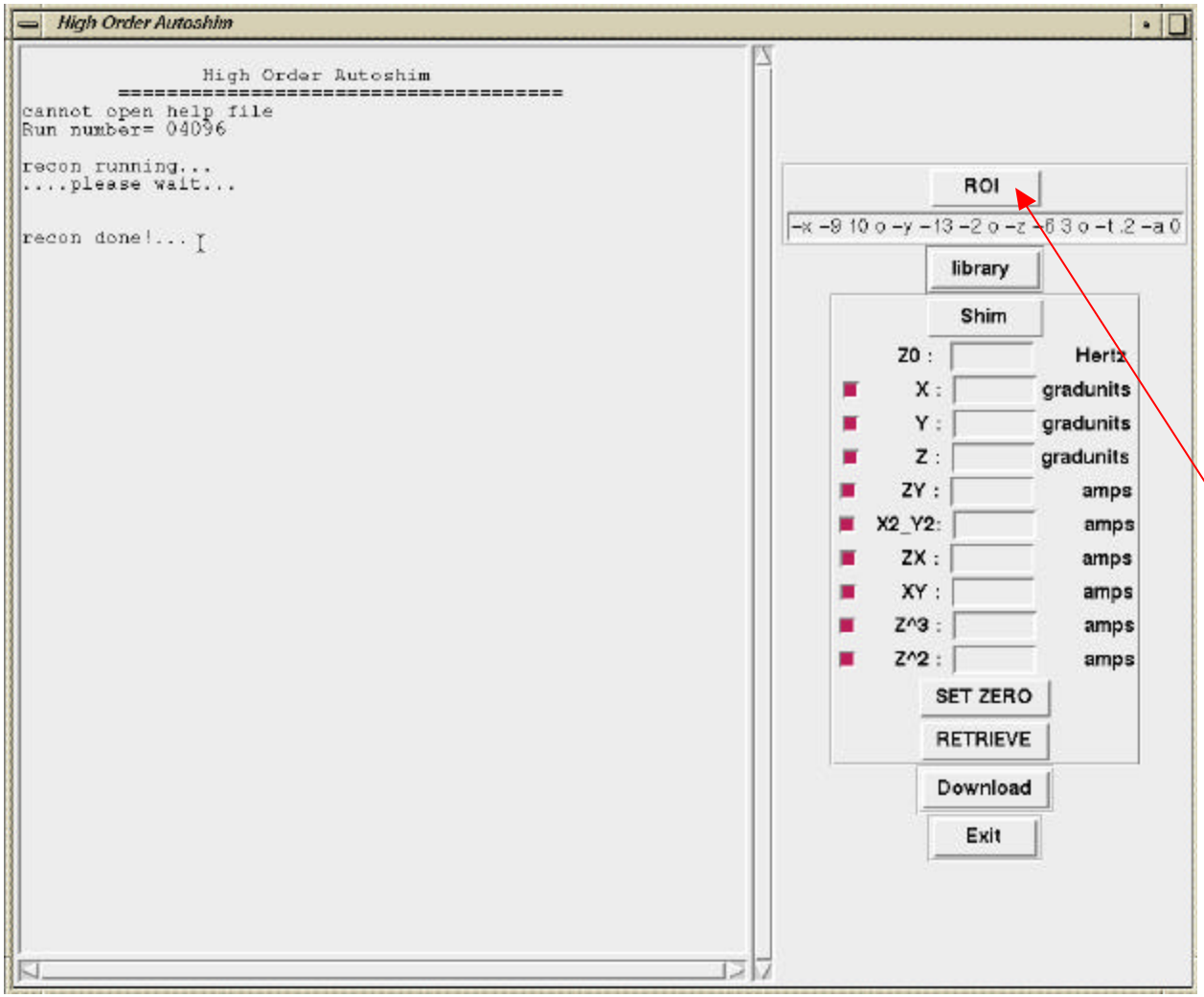
- Tools Icon
  - Open a C Shell in the Tools
    - Type shimcalc

Remember! Failed Connection for Shims



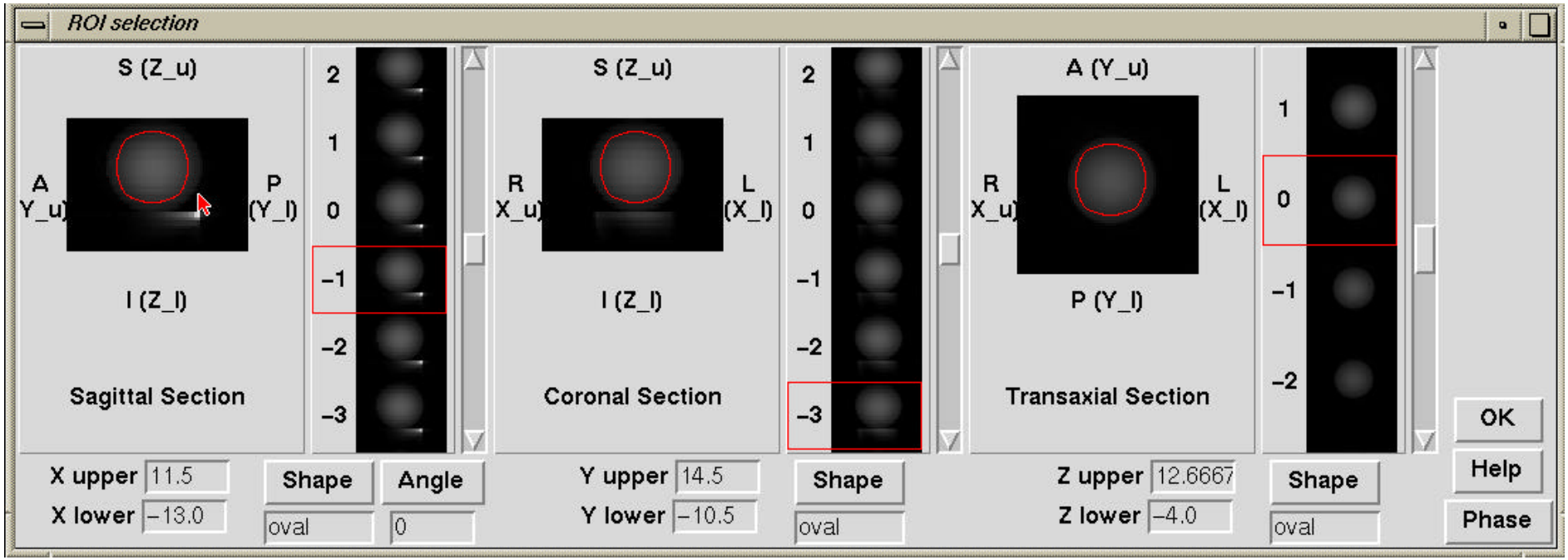
- Tools Icon
  - Open a C Shell
    - Type setzero
- Failed Connection
  - Bring scanner down and then reboot until you get a good connection

High Order AutoShim



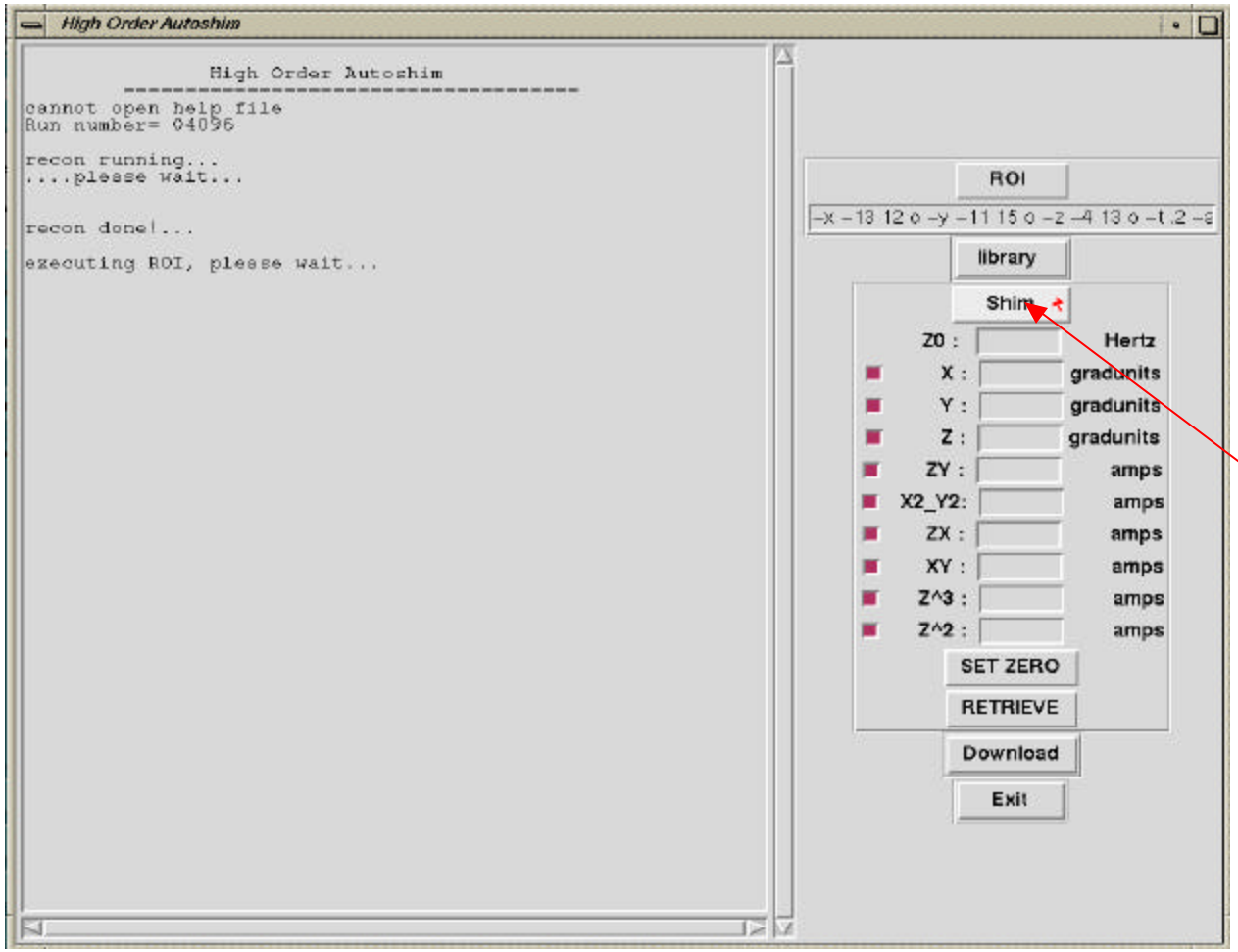
- Wait for the "Recon Done" message
- Click on ROI

High Order AutoShim - ROI Placement



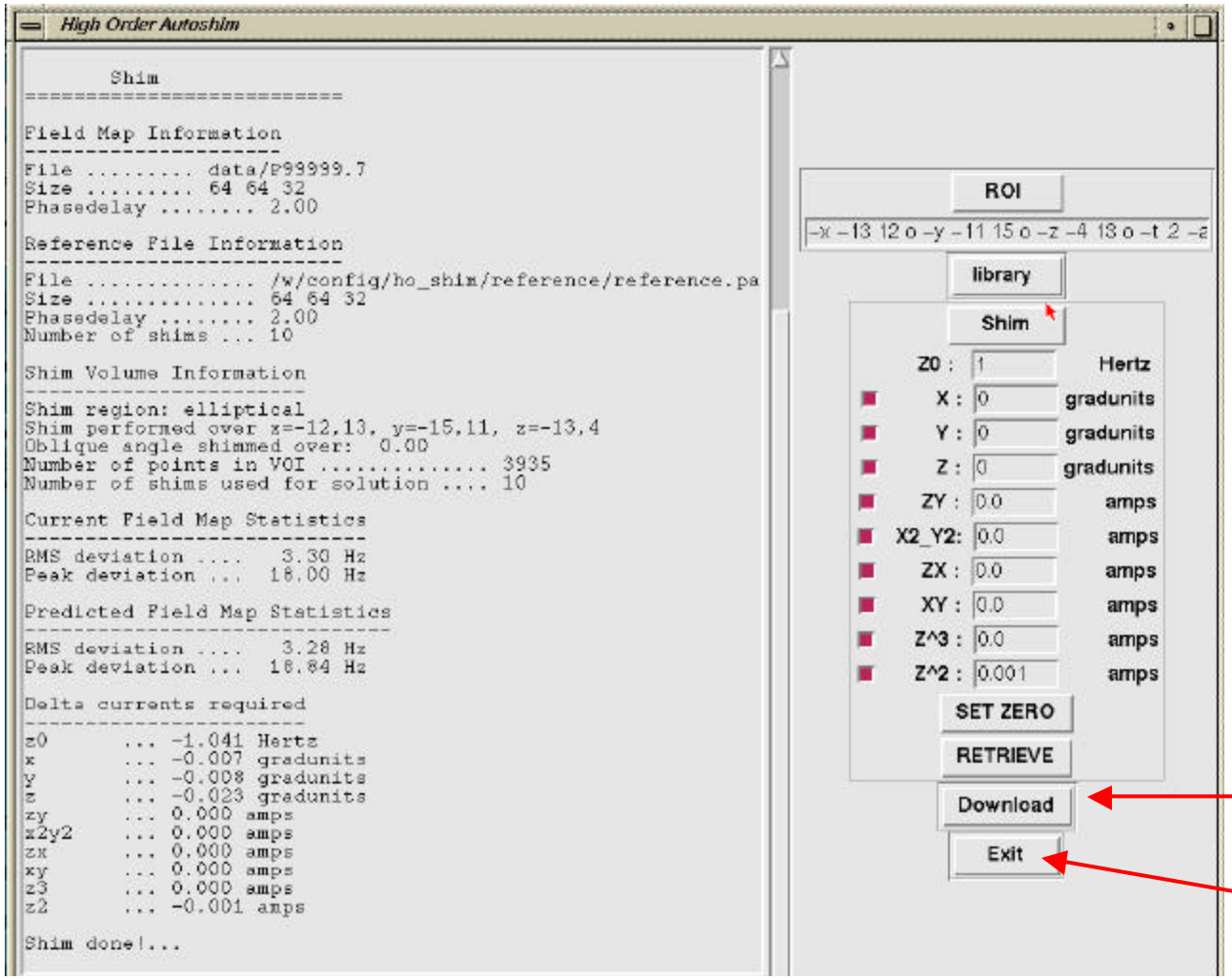
- Be sure to place the ROI correctly
  - Not too small
  - Not too large
  - All 3 planes

High Order AutoShim



- Wait for ROI values
- Click on SHIM

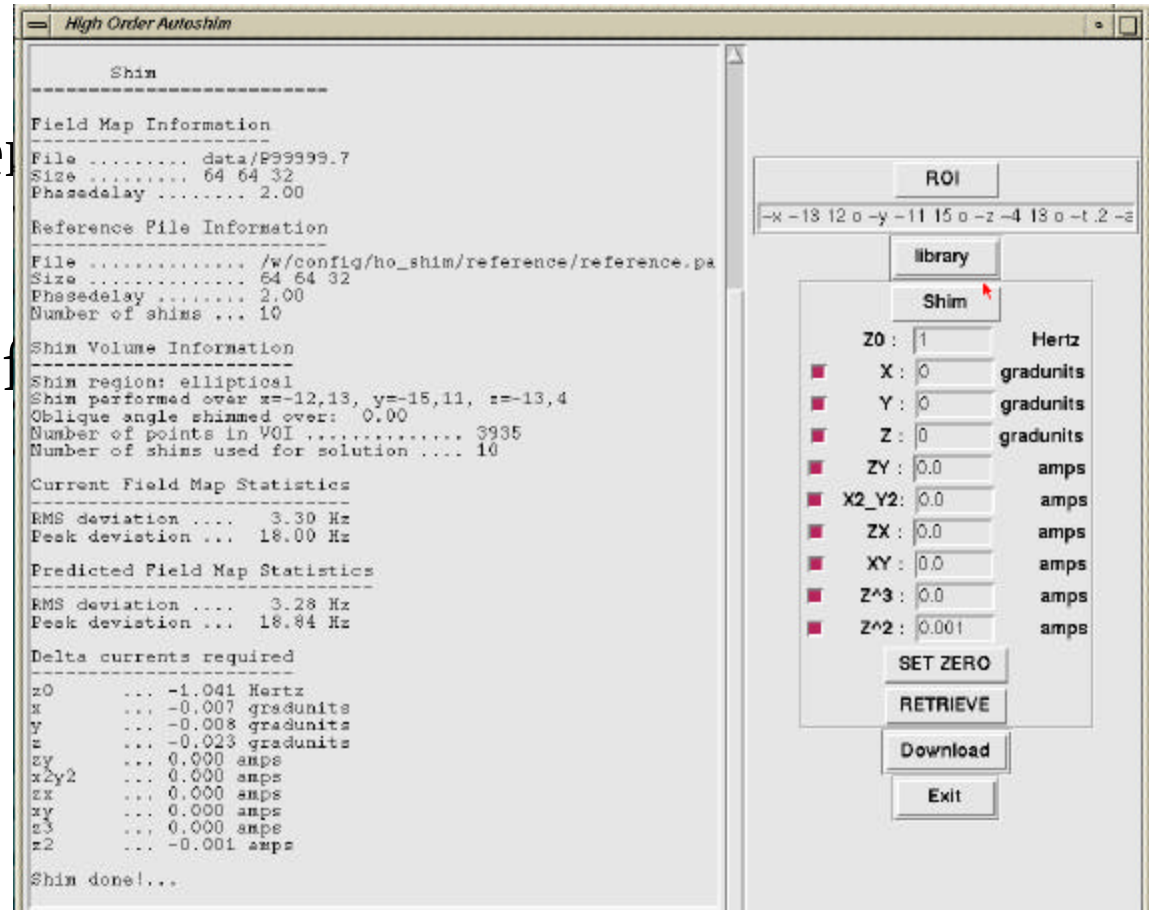
Results from the High Order AutoShim



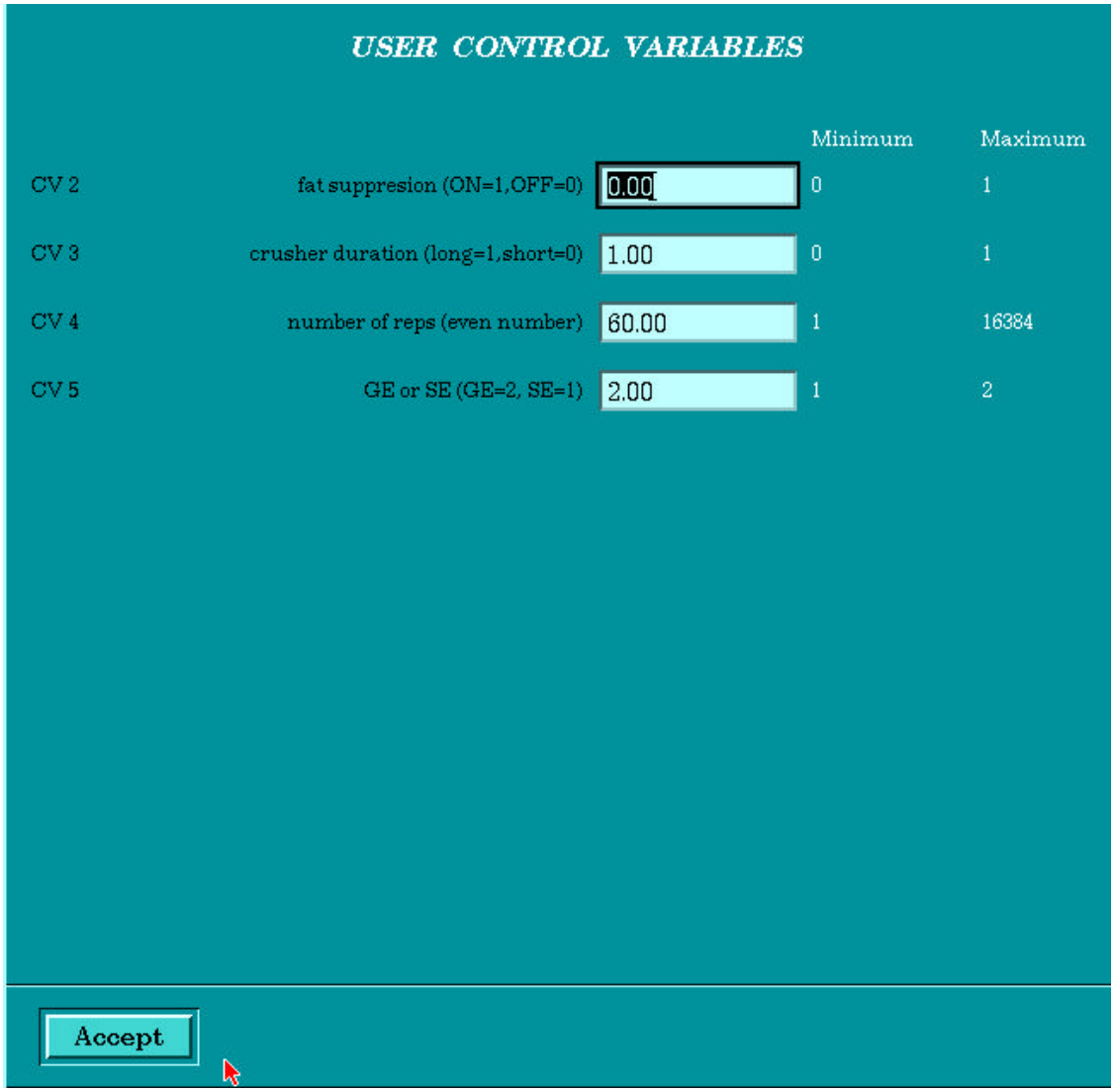
- Wait for SHIM results
  - "SHIM DONE!"
- Acceptable Z_0 Shim value
  - = +/- 3 Hz
  - Download
- Exit

High Order Auto Shim ?

- X, y, z = gradient shims of the 1st order
- x^2, y^2, z^2 = values of the gradient shims times itself
- X^3,y^3,z^3 = values cubed

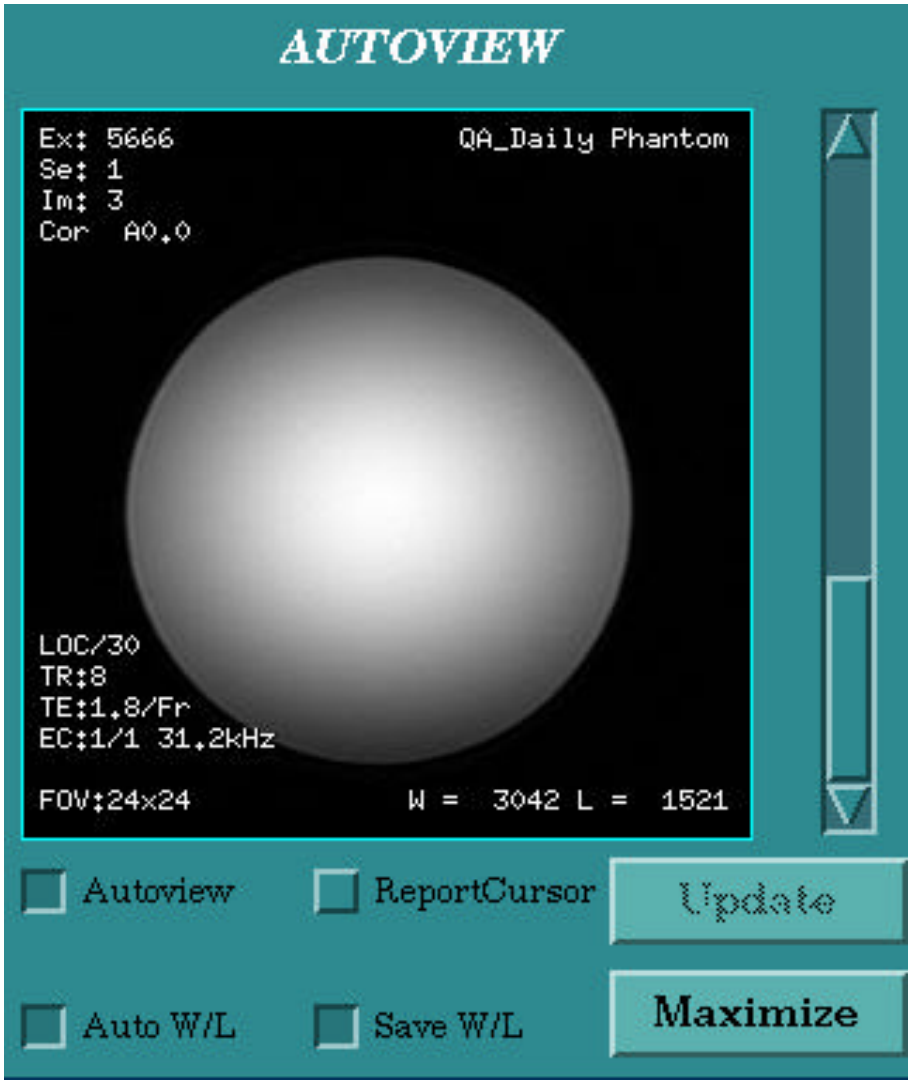


User CV Window



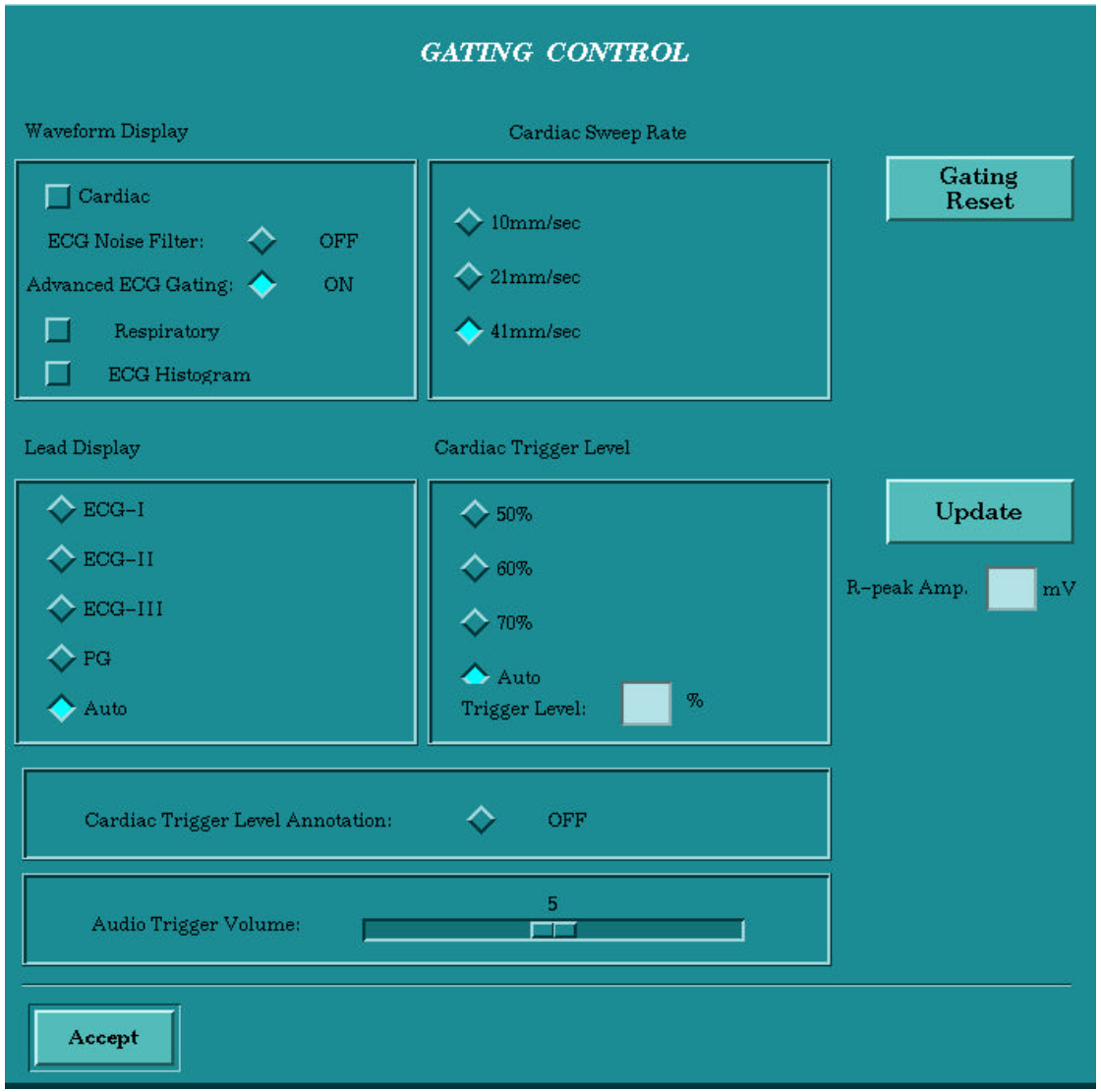
- CV = Control Variable
- The User CV Window is located within the Scanner Operations Pages
- Do not confuse with the Research Options Page
  - Display CV's

Auto View Window



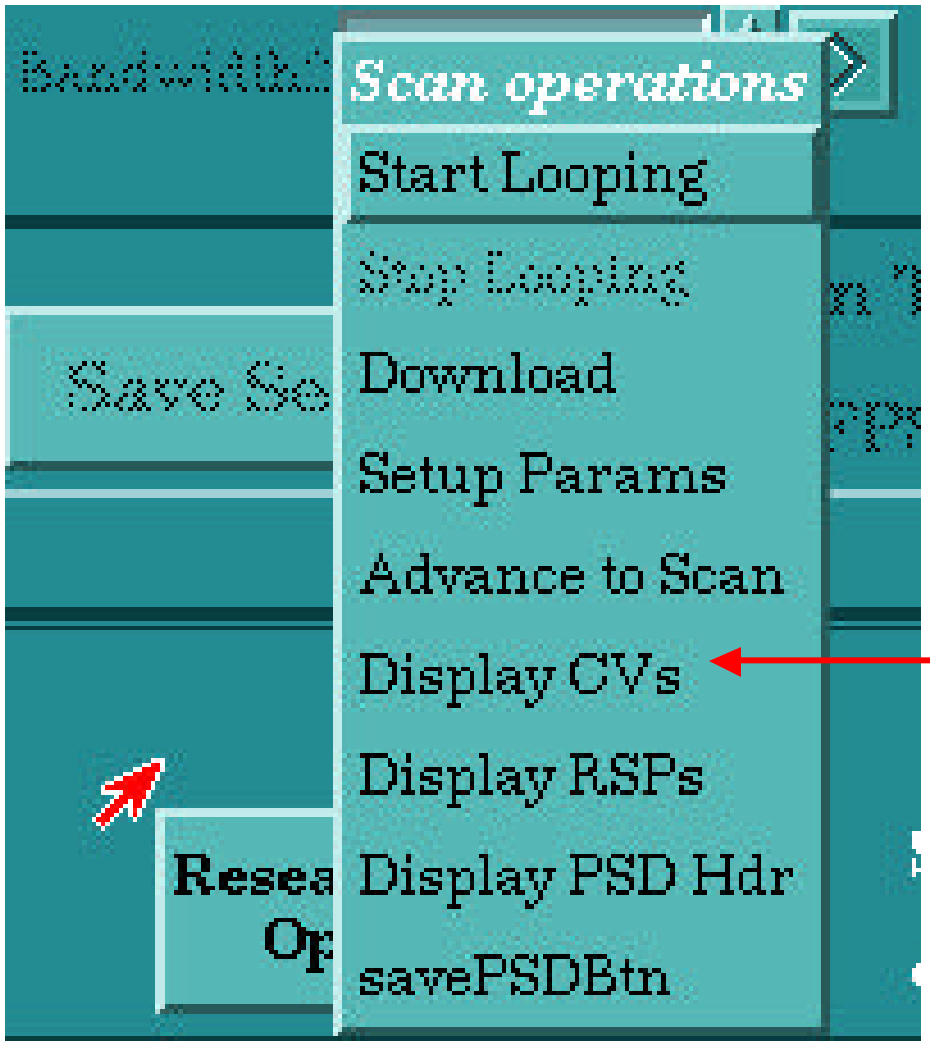
- Exam number
  - Series number
  - Image number
- Click *Autoview* for image updates
- Click *Report Cursor* for location information

ECG Gating Control Window



- This is the Default setting
  - Click on appropriate settings for gating or pulse oximitry

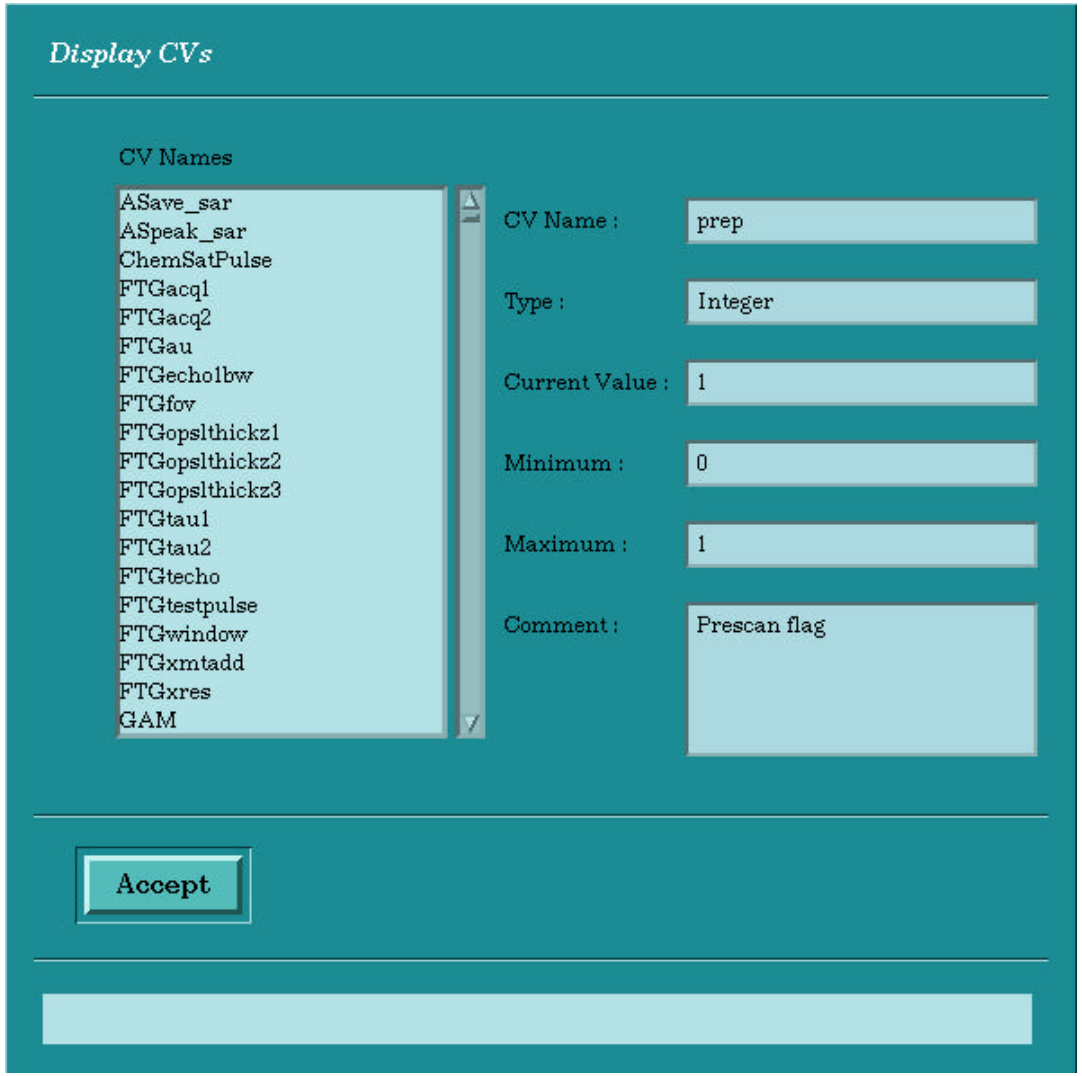
Research Options



**must be in Research Scan Mode ** to display the CV's

- Use RMB
  - Display CV's

Display CV's in Research Options



- Use RMB to open CV's
- Change the Current Value if necessary

Anatomical Image Scanning

- Anatomy
- Morphology
- Structural

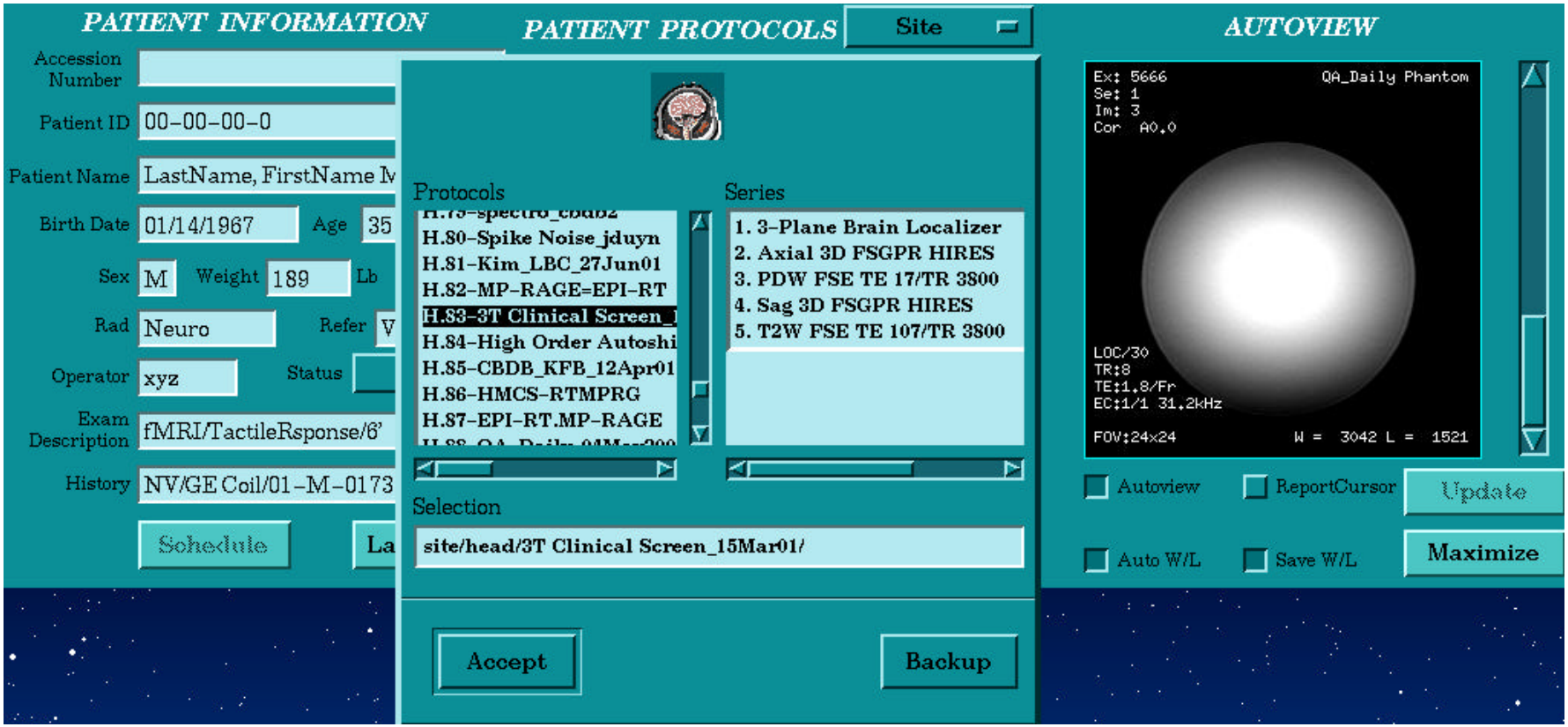
- Clinical Scans

Clinical Scans

The Clinical Scans

- Required on all subjects 1 x per year
- Required if order reads “MRI Brain”

Clinical Screen H.83



- This is the correct Clinical Screen Protocol for 3T-1
- Clinical Screen Protocol is Scanner Dependent
  - Check with the technologist for correct protocol

Clinical Scans on 3T-1

- Head. 83

- 1. 3 plane localizer

- 2. Axial T1 W, 3D, with IR Prep *
- (to replace the SE T1W)

- 3. Sag T1 W, 3 D, with IR Prep
- (to replace the SE T1W)

- 4. Axial PDW FSE, single echo
- (match slices exactly to the T2W)

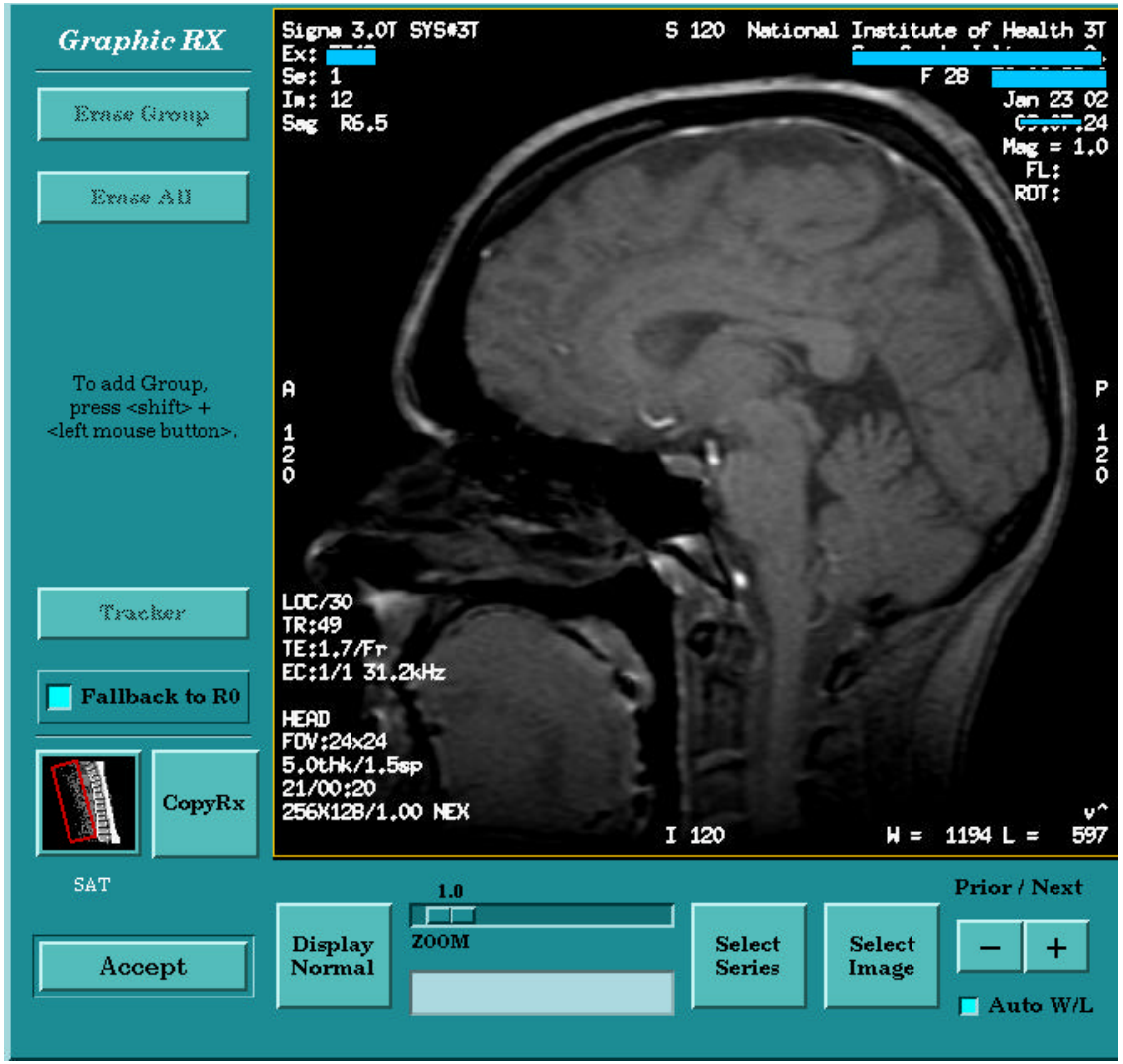
- 5. Axial T2W FSE, single echo (match slices exactly to the PDW)
-

- All scans are head-first and Supine using the GEMS/MAI head coil

- * May use MP-RAGE for the Axial FSPGR

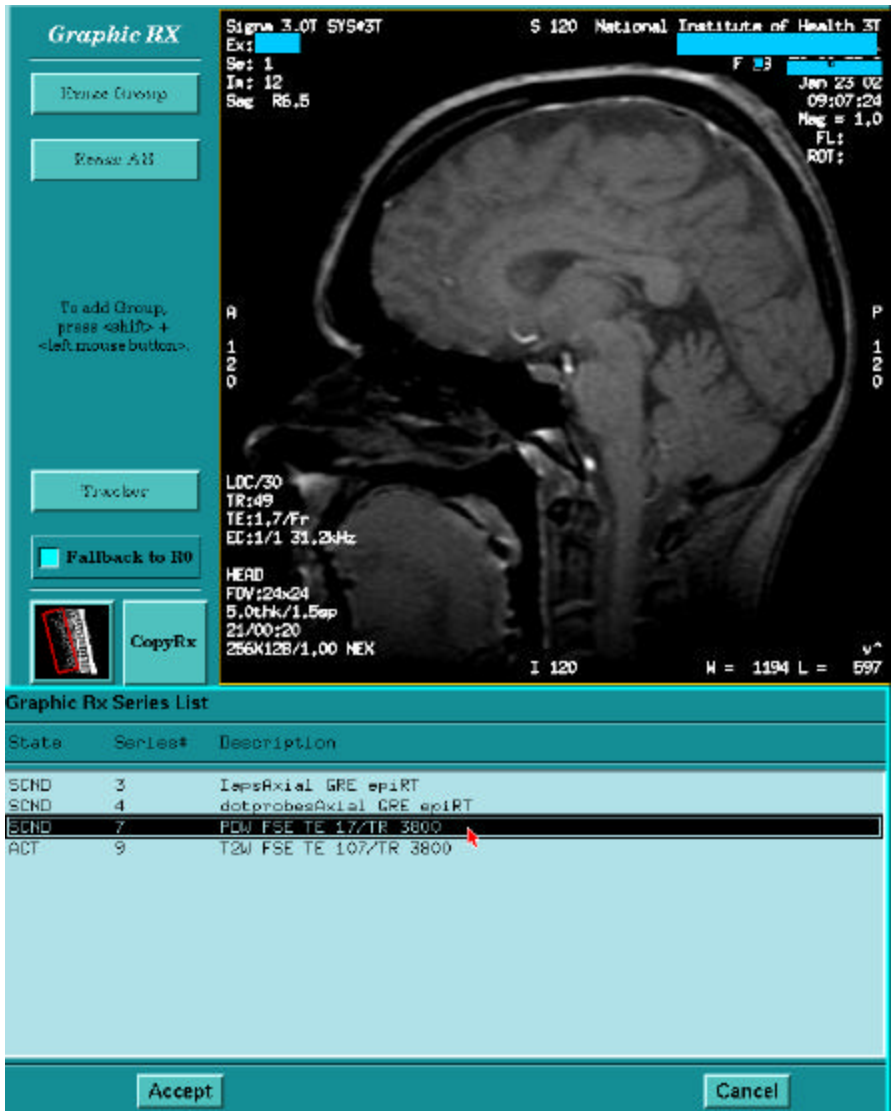
- The scan locations for the PDW FSE and the T2W FSE must match

Using the Copy RX Option



- ***Copy RX_Step 1***
- ***Bring up the correct image***
  - ***Sagittal for Axial or Coronal Slices***
  - ***Axial for Sagittal or Coronal Slices***
  - ***Coronal for Axial for Sagittal Slices***

Using the Copy RX Option

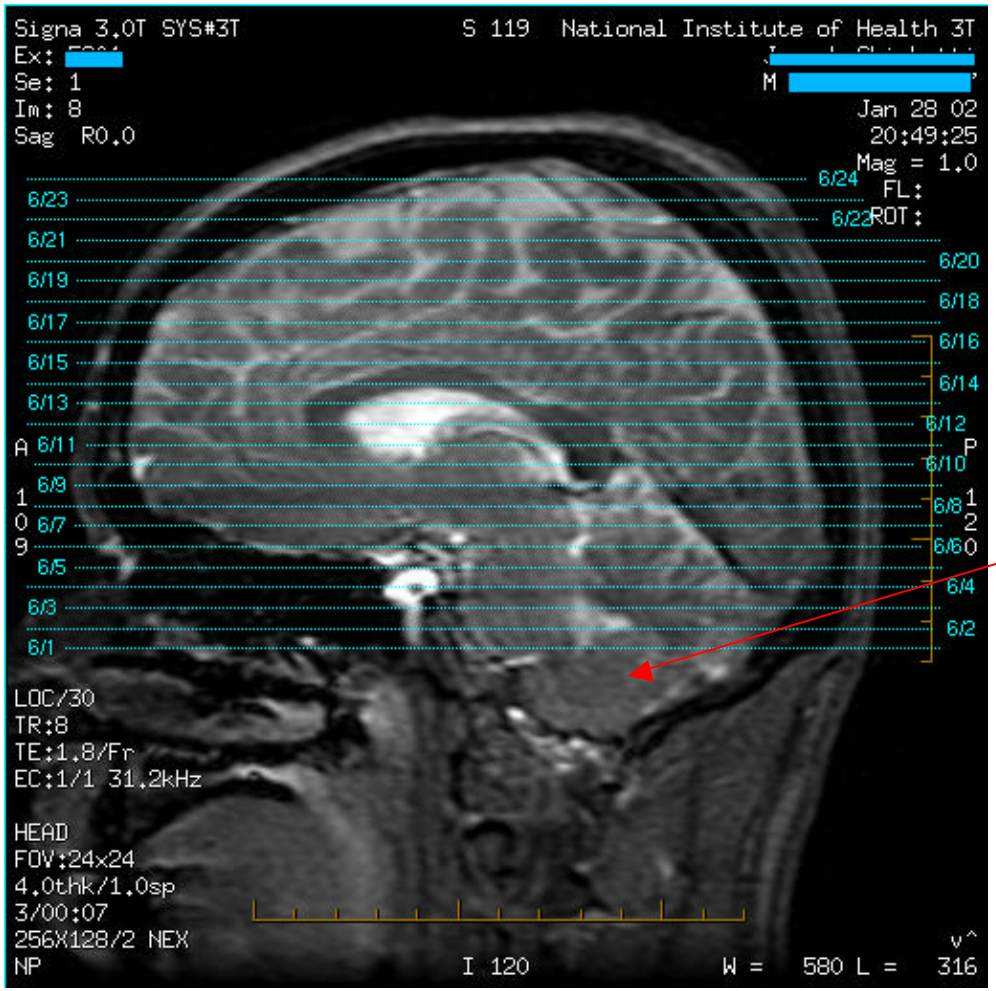


- ***Copy RX_ Step 2***
- ***Click on correct series and image***
- ***COPY RX***
  - ***Copies the RX for a previously prescribed series***
  - ***Essential for:***
    - ***PDW FSE***
    - ***T2W FSE***

Using the Copy RX Option

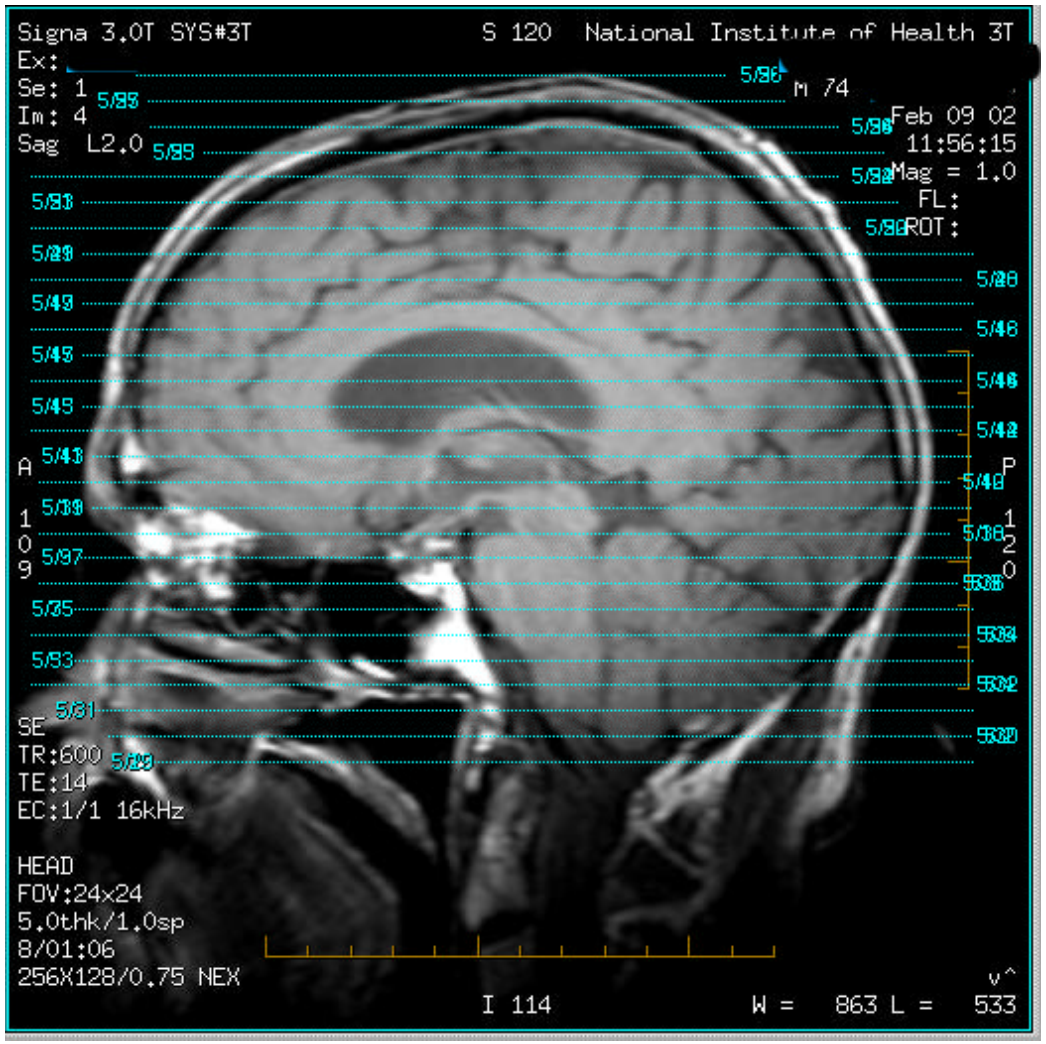
- ***Copy RX_Step 3***
- ***Image locations should match exactly***

Image Showing Incomplete Clinical Slice Locations



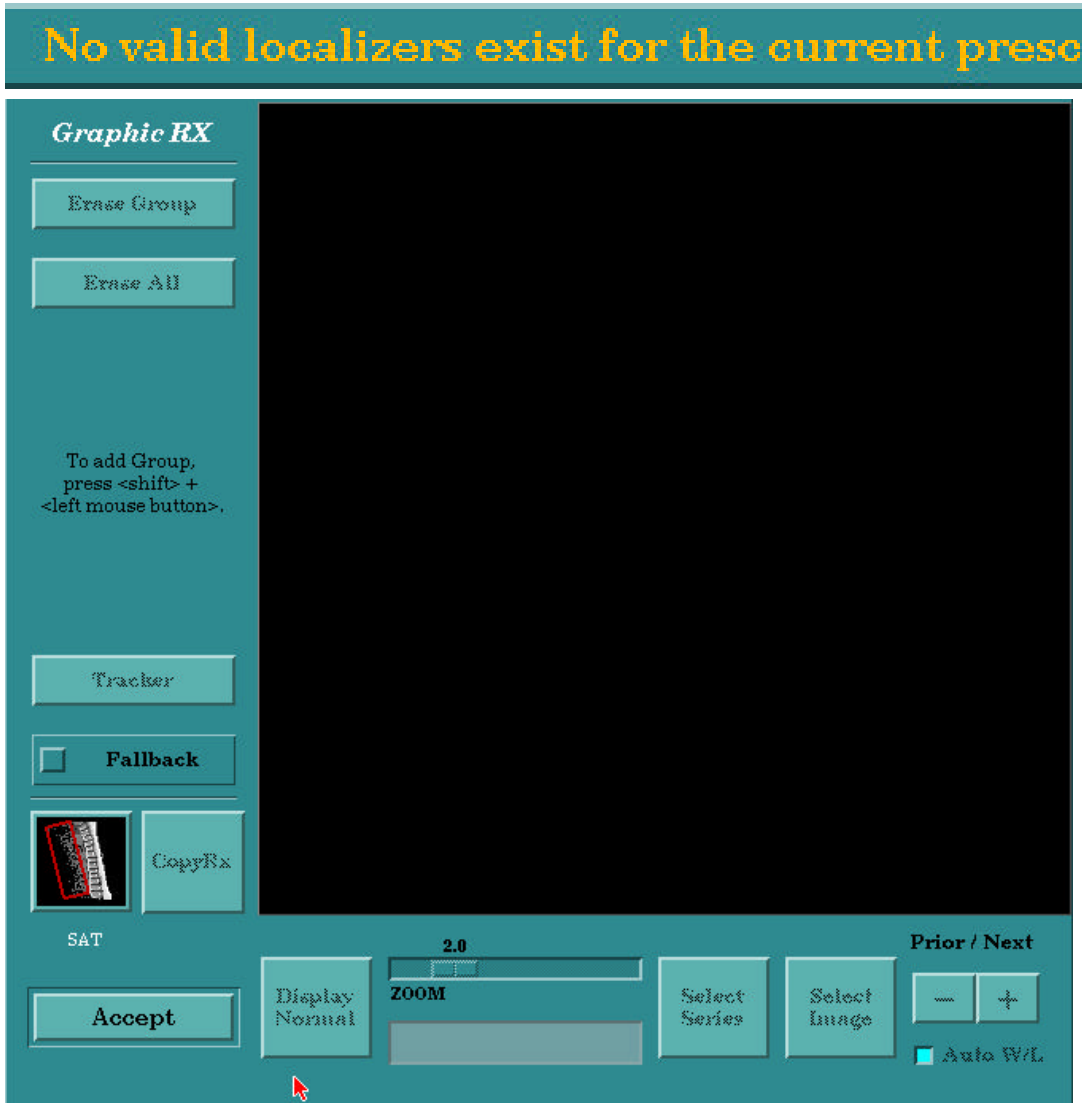
- Inferior brain not covered

Wasted Coverage on Clinical Scan



- Need only to cover the brain
  - Not above
  - Not below

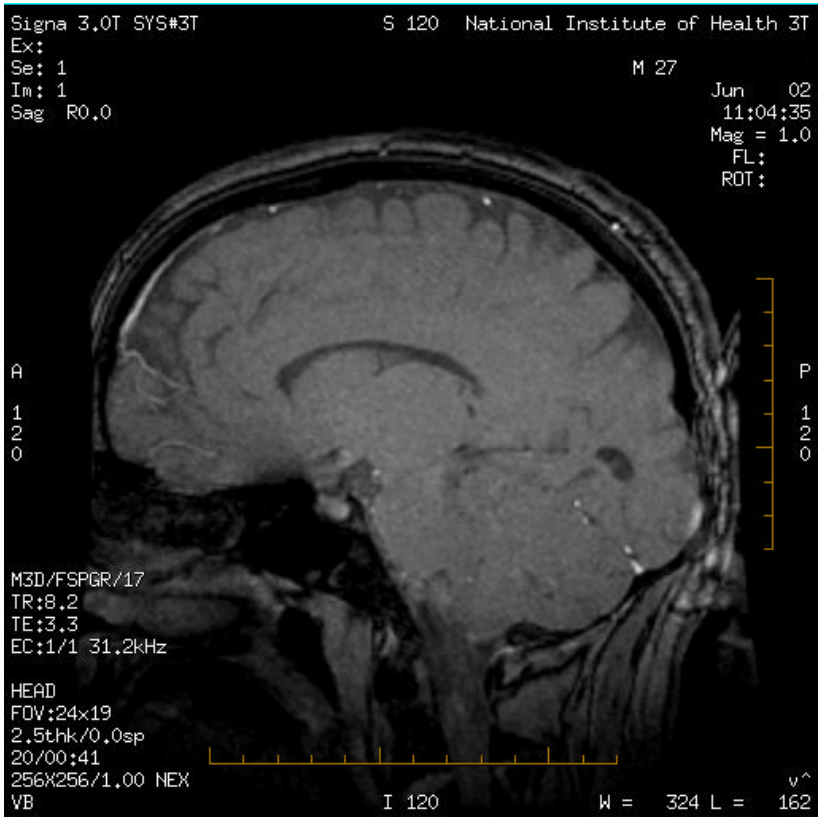
Invalid Localizer ?

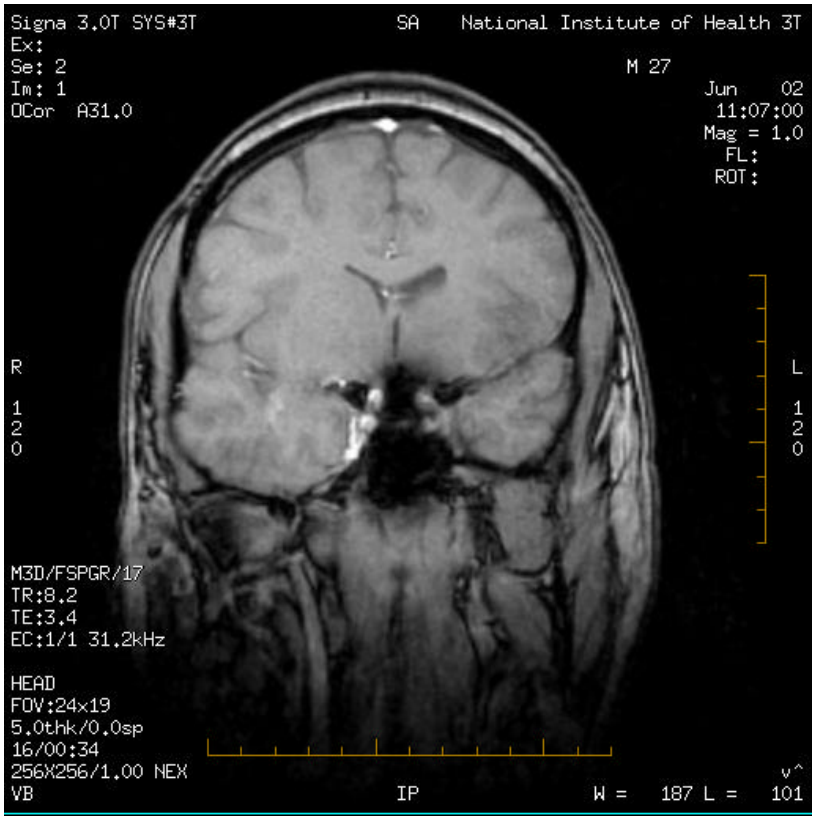


- Can only prescribe an orthogonal scan plane
- Axial
  - Coronal
  - Sagittal
- Sagittal
  - Axial
  - Coronal
- Coronal
  - Axial
  - Sagittal

Tech Tips and Tricks

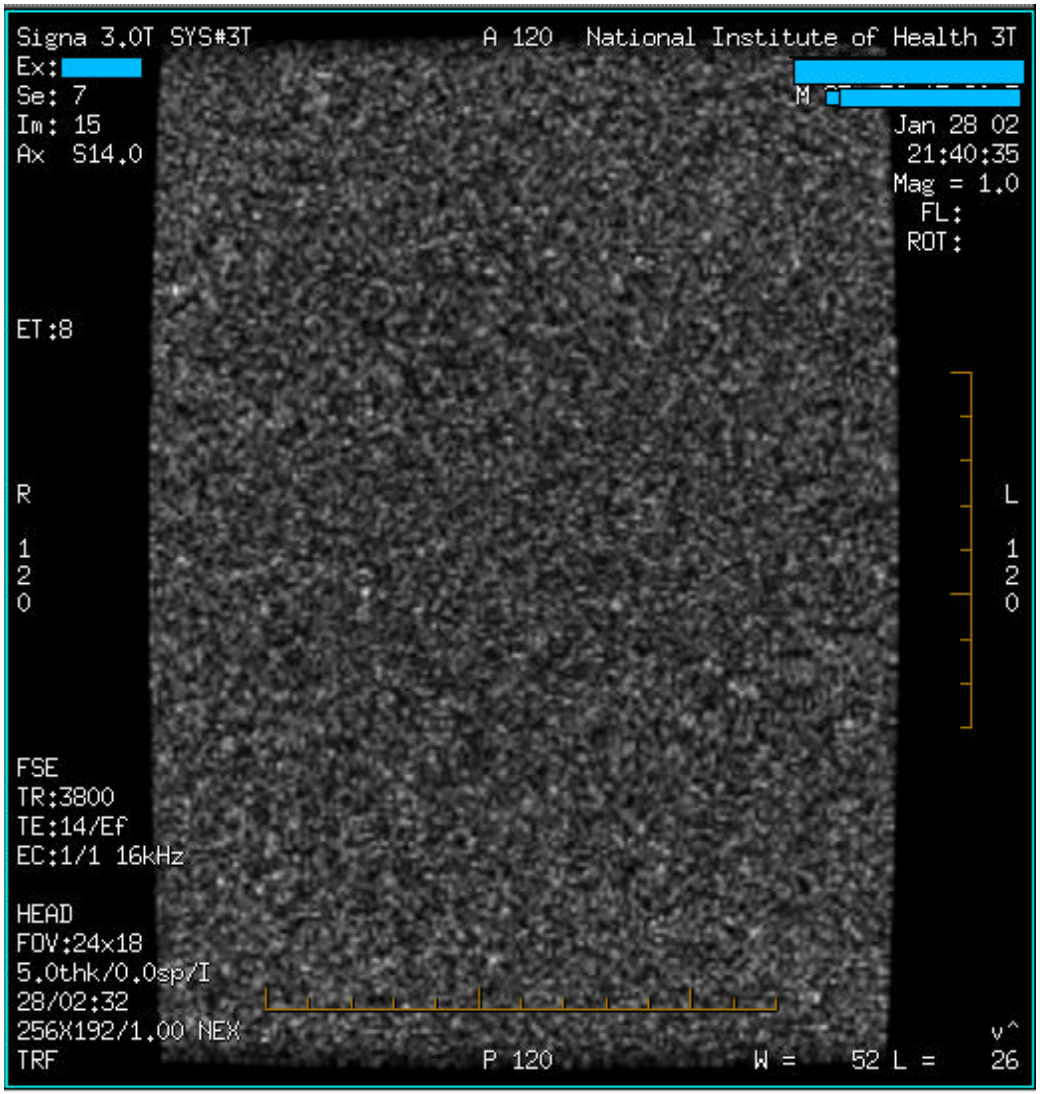
Head Not Straight





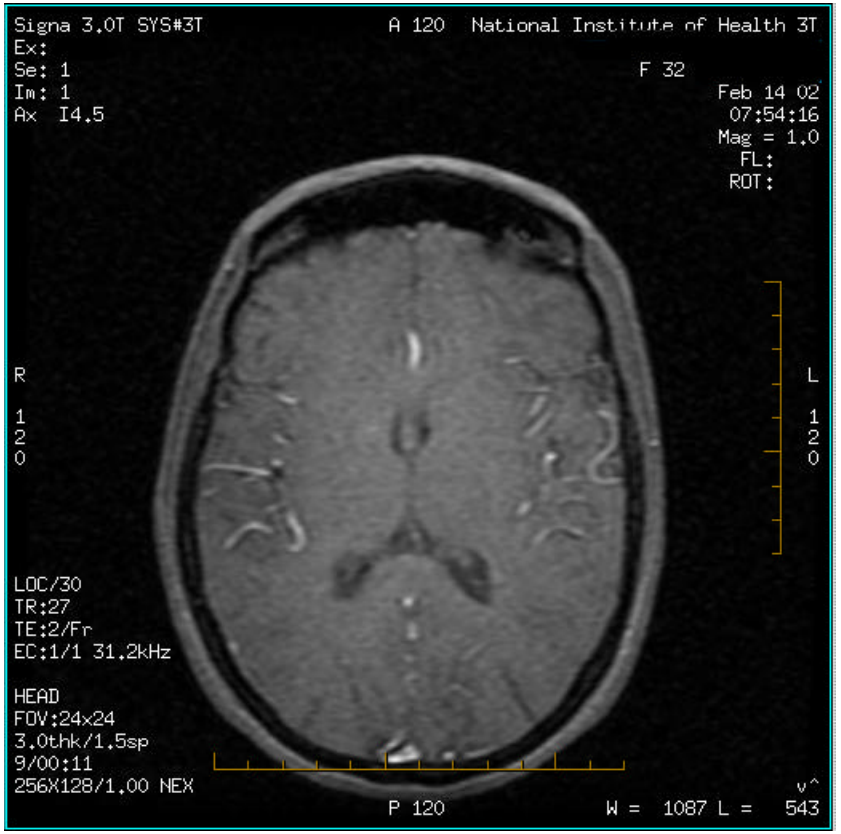
- When starting with a sagittal localizer you risk not knowing if the head is straight. Especially, when there is no midline slice.

Image with No RF



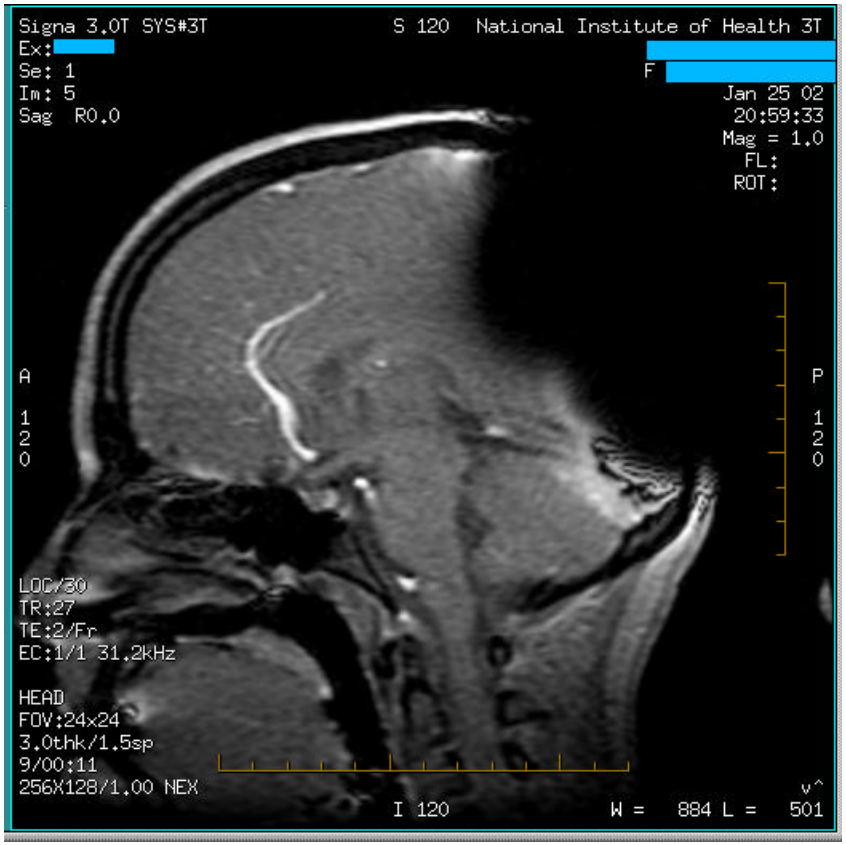
- Check the Power Monitor Status
- Make sure coil is plugged in correctly
- Is the head coil in correct position?
- Did the previous researcher disable the RF?

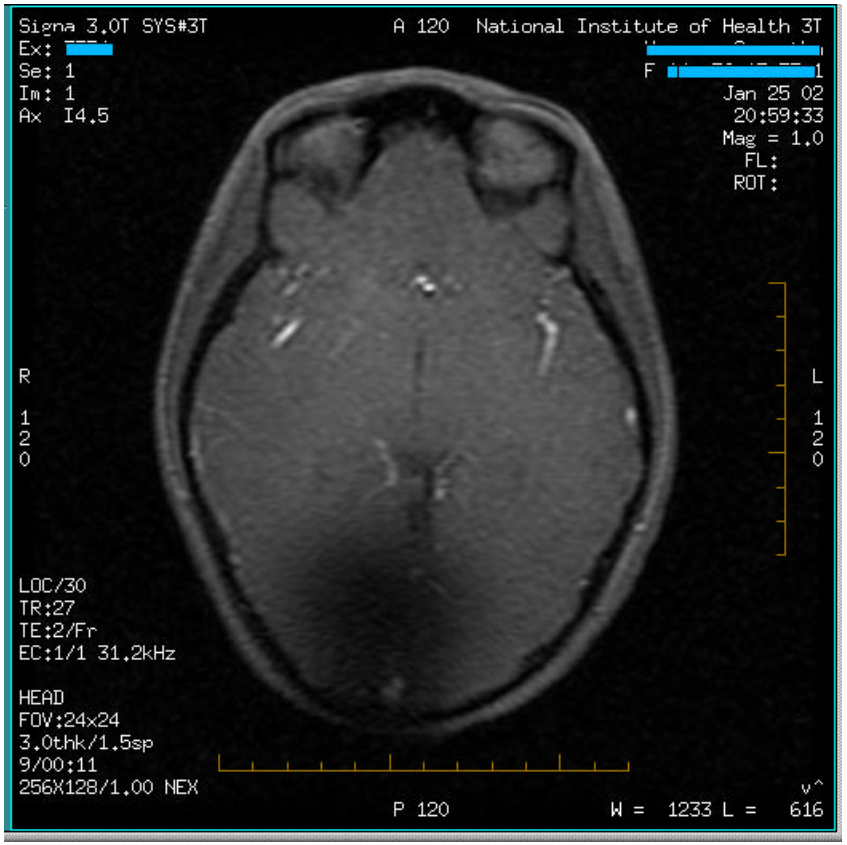
Noisy Image From a Small Piece of Metal in the Magnet



- Same patient, same sequence
- Before and after the removal of a paper clip in the magnet

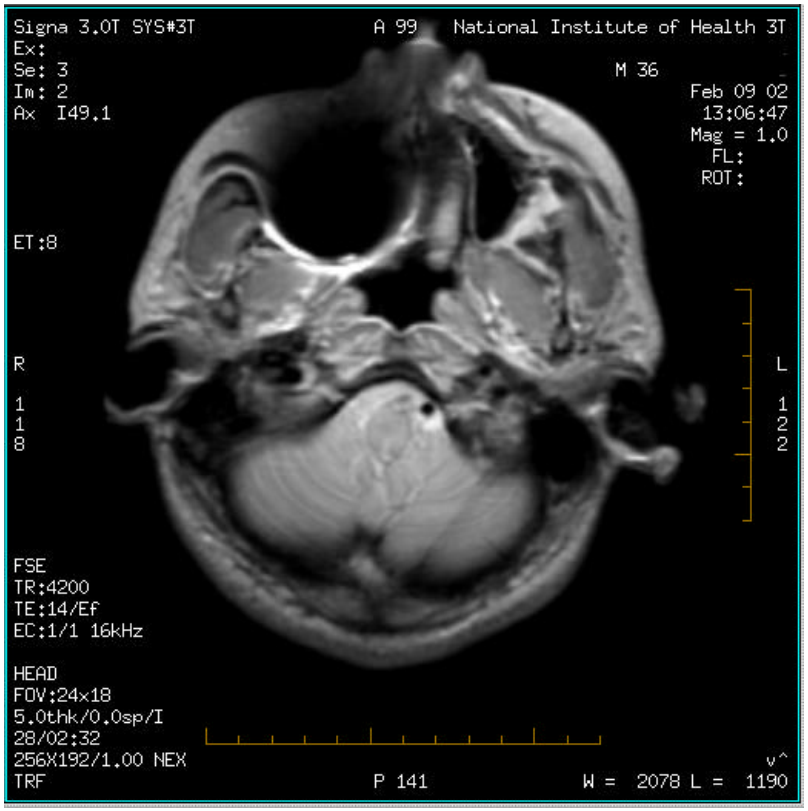
Trouble Shooting Image Problems



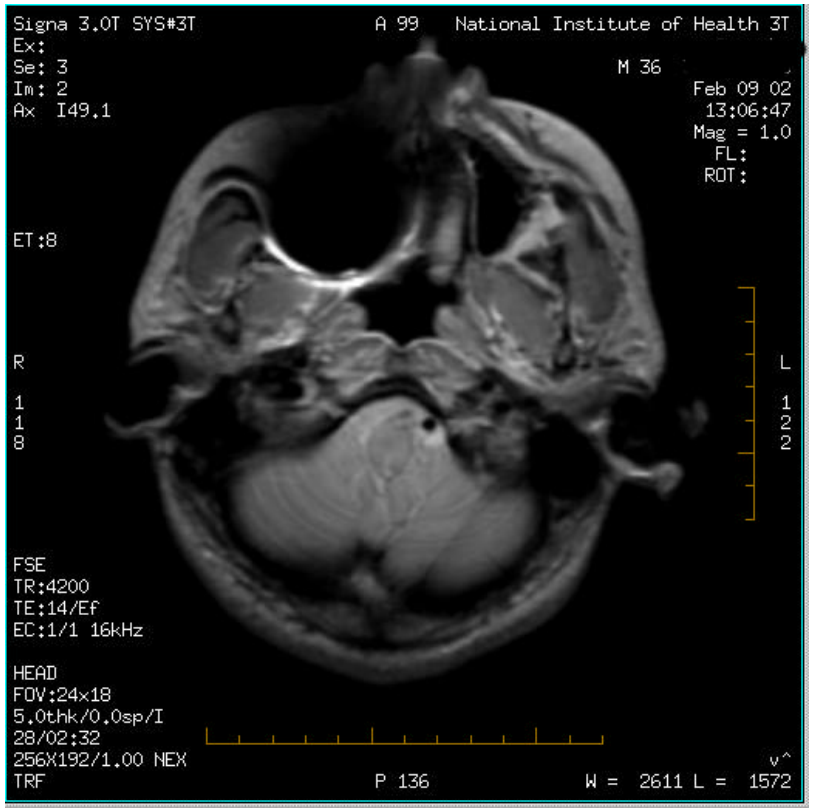


- Hair “Scrunchie”
- Hair bands for ponytails
- etc

Susceptibility Artifacts From Dental Work (Steel Tooth)

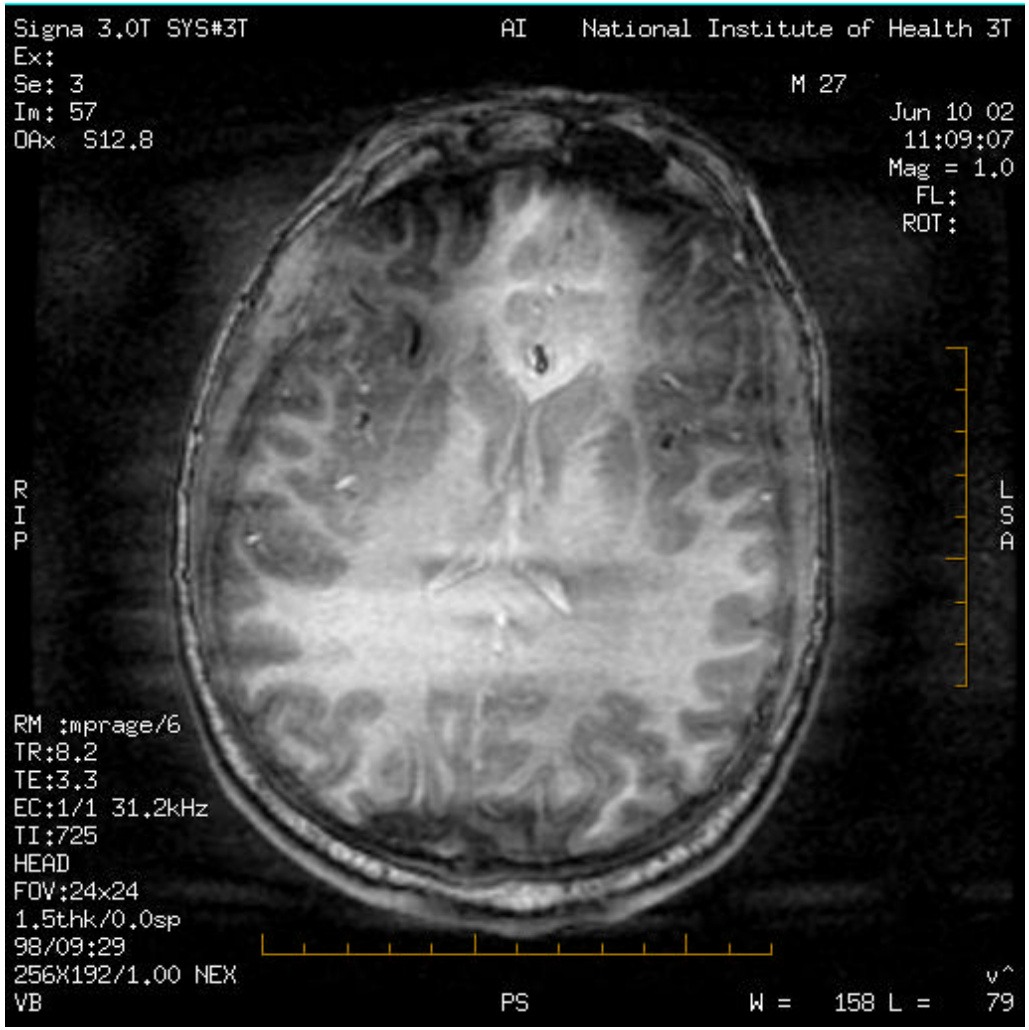


PDW



T2W

Structural Image Distortion



- Patient Motion
- Poor Shim
  - Off Center Frequency
  - Over-range

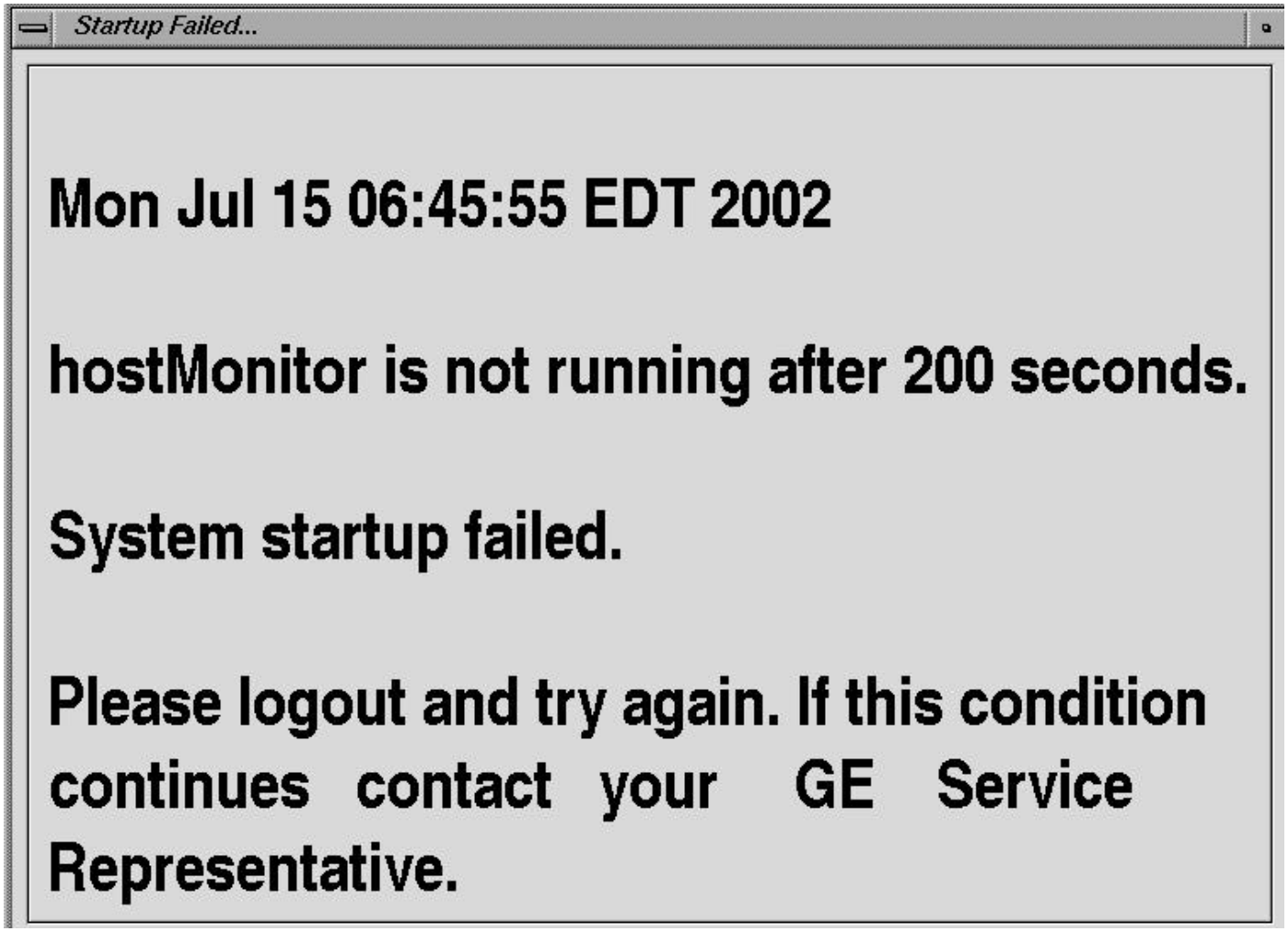
Additional Images and Useful Information Available at:

- http://wwwrad.pulmonary.ubc.ca/stpaulsstuff/MRartifacts.html
- http://www.cis.rit.edu/htbooks/mri/
- http://brainmapping.loni.ucla.edu/BMD_HTML/SharedCode/slides/SlideFiles.html
- http://brainmapping.loni.ucla.edu/BMD_HTML/SharedCode/TINS/FMRI-TINS.html

So, What are we doing?

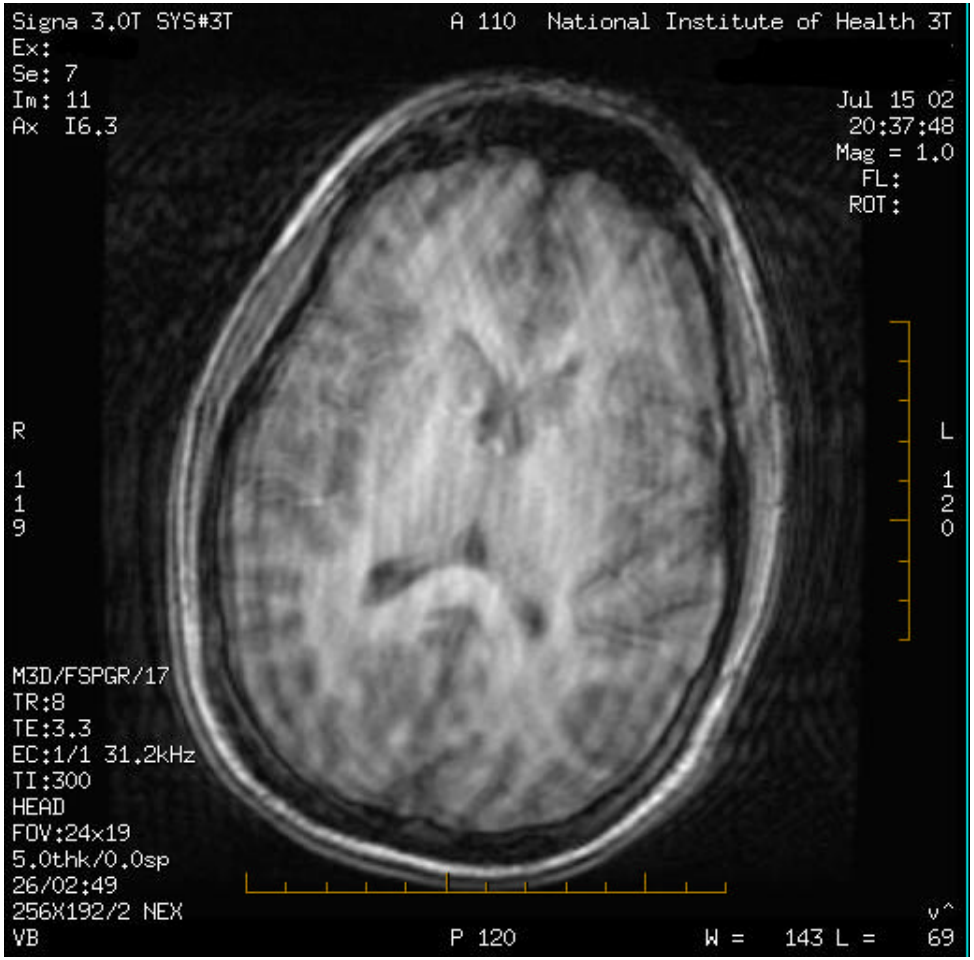
- Running QA programs
- Stocking the room
- Archiving
- Filming
- Paperwork
- Trouble Shooting database errors

Host Monitor Failure

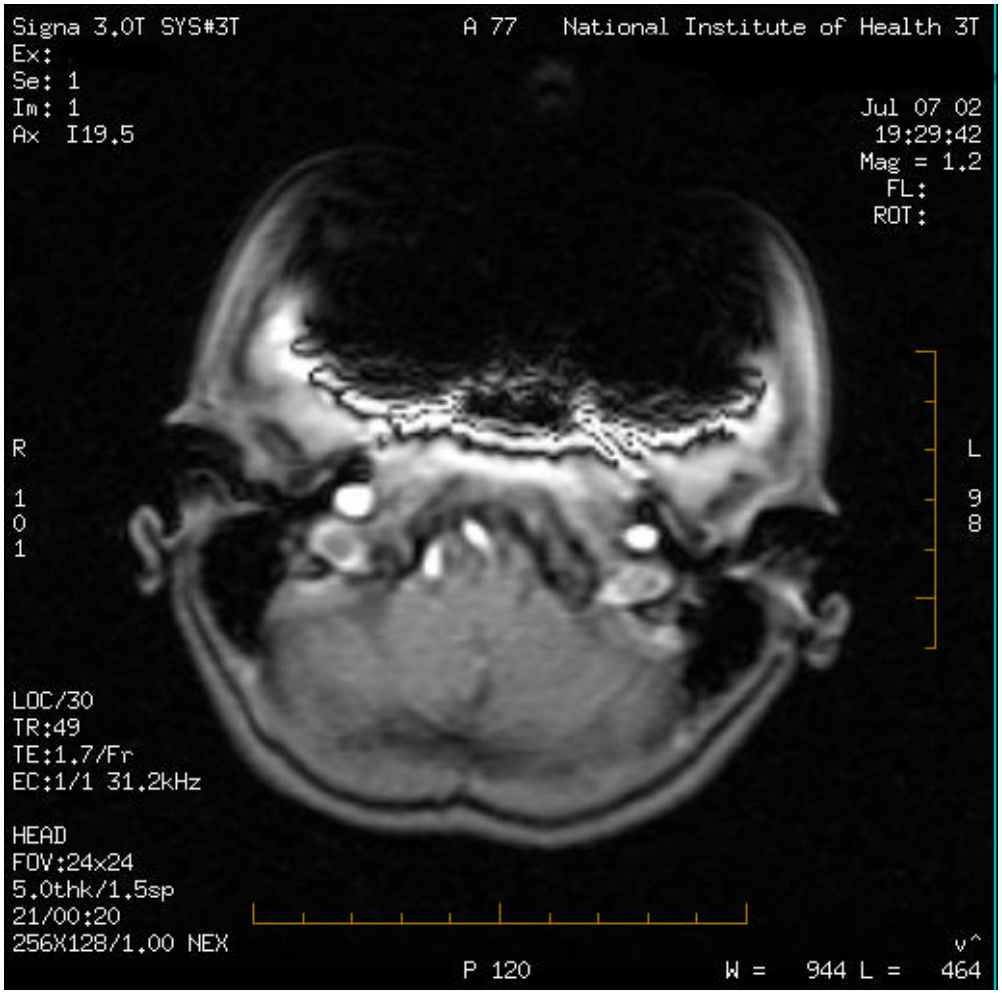


- Can happen during the Start-up procedure
  - rmb
  - logout
  - reboot Signa

Patient Motion Degrading Image Quality

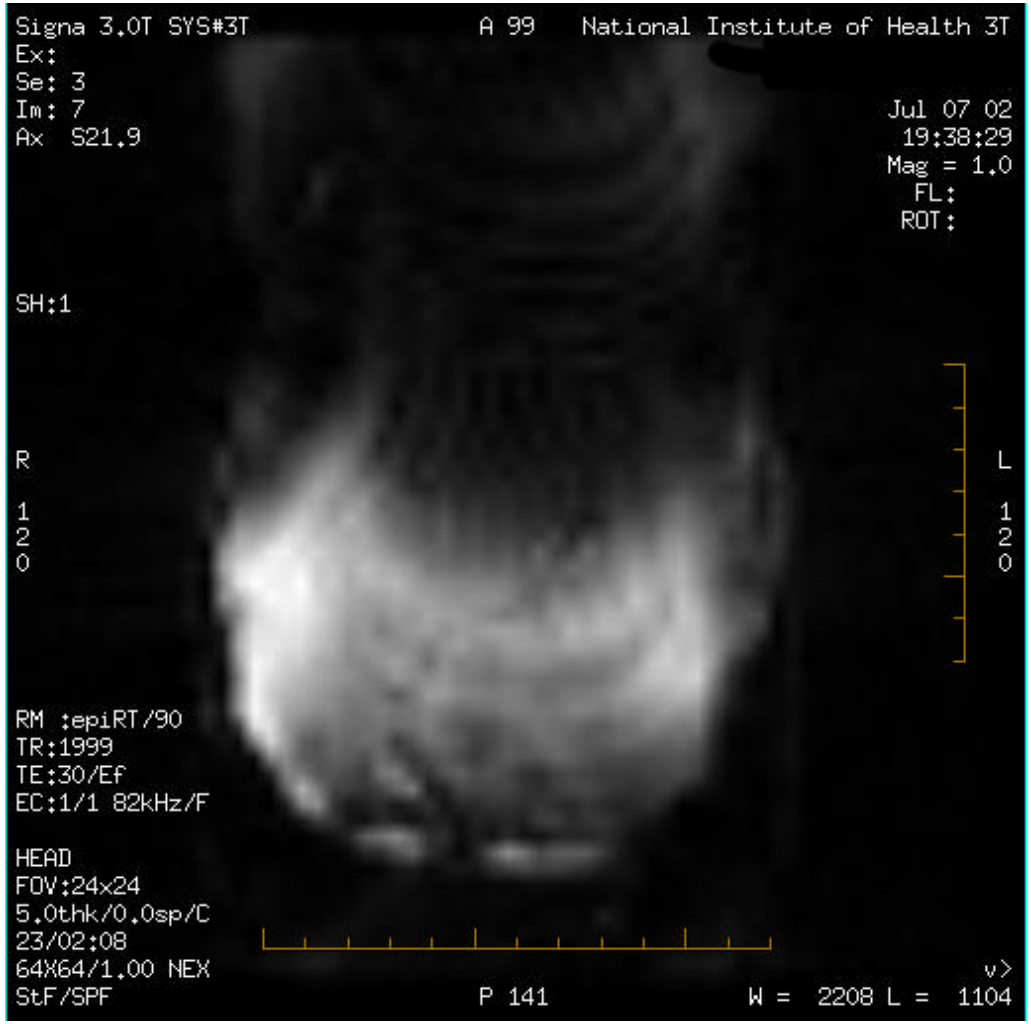


Susceptibility Artifact from Braces (Localizer)



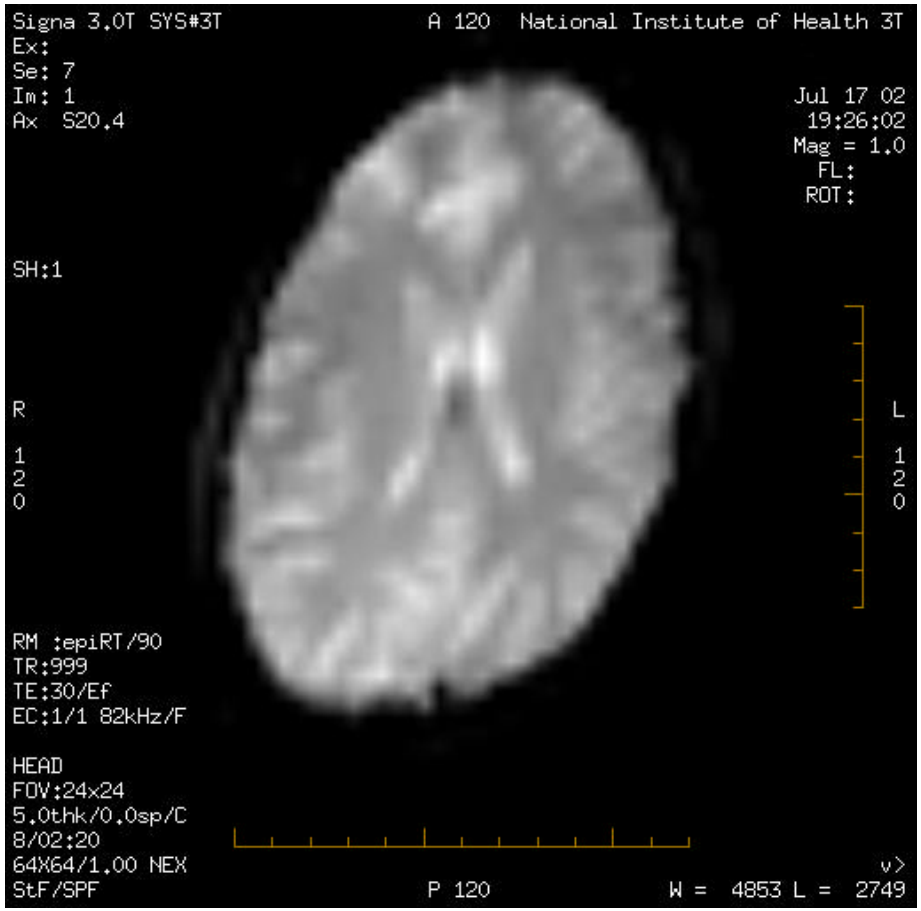
- Patient with braces
- 3-plane localizer

Susceptibility Artifact_Braces_EPI



Not worth scanning EPI

Shims Out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A 120 National Institute of Health 3T
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Se: 7
Im: 1
Ax S20.4
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19:26:02
Mag = 1.0
FL:
ROT:
SH:1
R
L
1
2
0
RM :epiRT/90
TR:999
TE:30/Ef
EC:1/1 82kHz/F
HEAD
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8/02:20
64X64/1.00 NEX
StF/SPF
P 120
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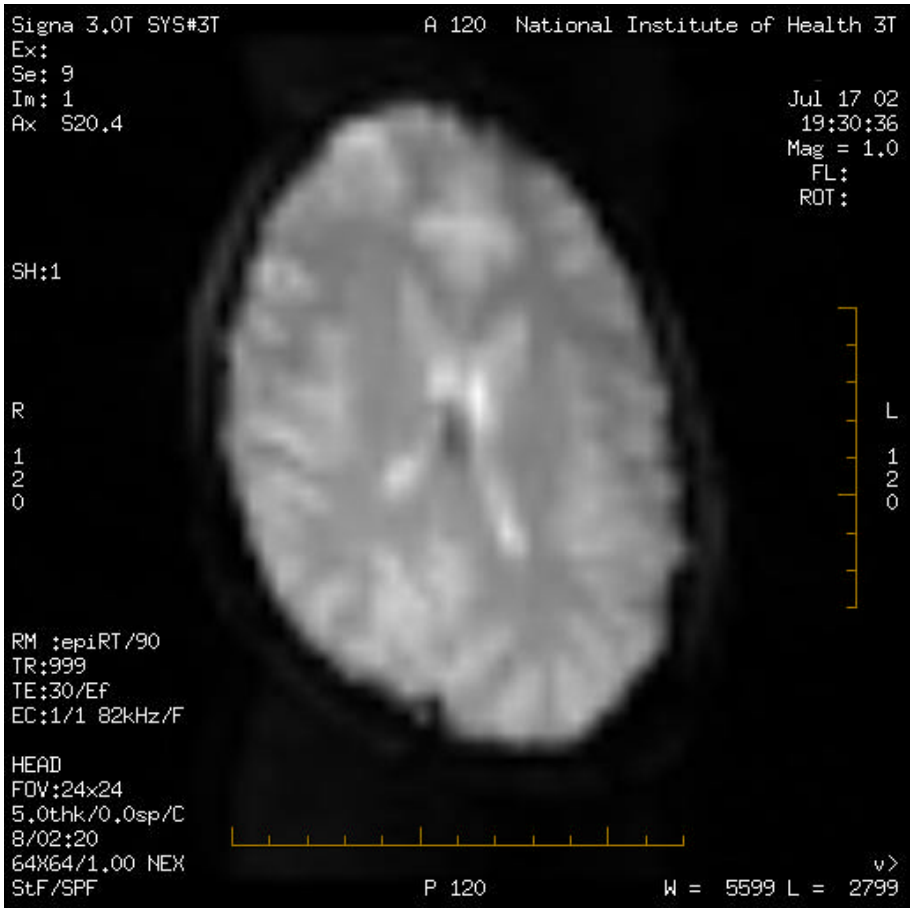
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Acknowledgements

3 Tesla Core Facility

NHLBI

NMR F

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GE Medical Systems

Avotec, Inc.

Medrad, Inc.

Berlex Laboratories

ACR Glossary of MR Terminology